JANUARY, 1955

Traffic Engineering

A Parking Lot for a Secondary Shopping Center

- Determining the Degree of Hazard at School Crossings
- Parking Lots for Secondary Shopping Centers
- 15 Years Rural Freeway Construction
- Truck Weight Enforcement Stations in North Carolina

Official Publication of the Institute of Traffic Engineers

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Traffic Engineering

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In This Issue

Determining the Degree of Hazard at School Crossings 137
Robert D. Dier

Parking Lots for Secondary Shopping Centers 140
Herman M. Batts, Jr.

15 Years Rural Freeway Construction 143
Walter Hodel

Truck Weight Enforcement Stations in North Carolina 150
James S. Burch

Yearbook Changes 153

Traffic News 154

Strictly Business 163

Looking Ahead 166

New Appointments 166

Section News 167

Letter to the Editor 172

Index to Advertisers 174

Membership Applications 174

COVER: The beautiful 360 car parking lot pictured here serves the shopping center located in the out-lying Livernois-Seven Mile area business district. It was the second such secondary shopping center parking lot to be put into operation by the Detroit Municipal Parking Authority in an unusual program to aid the small neighborhood shopping centers. Be sure to read Mr. Batts' article "Parking Lots for Secondary Shopping Centers."

DEFINITION: Traffic Engineering is that phase of engineering which deals with the planning and geometric design of streets, highways, and abutting lands, and with traffic operation thereon, as their use is related to the safe, convenient, and economic transportation of persons and goods.

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PARKING METERS

Frankly Speaking

THE BIRTH OF THE YIELD SIGN is being hailed by many as one of the finest recent accomplishments in the traffic engineering field. Further experience will demonstrate the accuracy of the early reaction to this relatively new device, but even at this stage, there may be a lesson in it for us all.

Drivers in general are sick and tired of the gathering accumulation of restrictive measures that hem them in on every side. The signs, signals, and markings that are so intimately identified with and necessary to the traffic engineer's work, unfortunately, are also used commonly to depict the seriousness of street and highway deficiencies. Traffic signals seem particularly offensive to John Q. Public, and one reads and hears much about the traffic jams and delays they create. Twenty-five years ago, the critics say, you could drive from here to there faster in a horse and wagon than you can today with the power of 150 horses under your hood. Then they give you the reason. Traffic is blocked by STOP lights and STOP signs.

In most cases, the facts are correctly stated, but the critics rarely let the traffic engineer off the hook just because the city has doubled its populationand sextupled its motor vehicle registration without providing more than a token improvement in its street facilities. Regardless of such events, he is expected to solve the congestion problem.

This is a fairly typical environment, at least for the city traffic engineer, and it is crystal clear that he cannot succeed indefinitely by employing merely the prohibitions and negative controls at his disposal. He must build a backfire somewhere along the positive side so there can be a gradual elimination of at least some of the undesirable and unpopular restrictions. This means integrated effort with planning officials and all those concerned with orderly and sound development of the community. It means careful planning of the traffic engineer's own program, to the end that operating effectiveness is achieved with the minimum practicable amount of negative regulation and control. If these steps are not followed, tomorrow's greater traffic will bring incomparably greater headaches for the practicing traffic engineer. The true benefits that intelligent traffic engineering offers will lose their potency if excessive reliance on negative measures becomes the rule.

As we were saying, the new YIELD sign may have a lesson to tell from its ready and favorable acceptance in many parts of the country. At least, it does not say STOP every time we see it.

Charles W. Prisk

Vice-President

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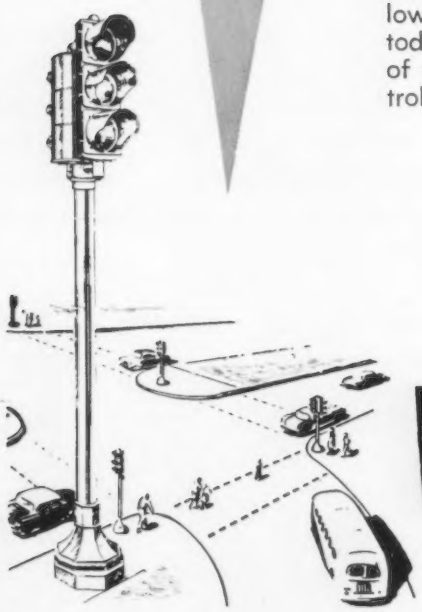

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Determining the Degree of Hazard at School Crossings

By Robert D. Dier (Mem., ITE)
City Traffic Engineer, Long Beach, California

Need for a Study Technique

ONE OF THE GREATEST NEEDS in the traffic safety field today is for a simple, uniform and reasonably accurate technique which may be used to determine the degree of hazard at school crossings. Such a technique is essential if engineering and safety measures are to be selected on a sound factual basis. If universally adopted and applied, the technique would tend to standardize safety measures throughout the nation and eliminate existing confusion and controversy in this phase of the traffic safety field.

Degrees of Hazard at School Crossings

In order to fully understand the problem of determining the degree of hazard at school crossings it is necessary to know what constitutes a "safe" and "unsafe" crossing. It might be said that when vehicular traffic conditions are such that frequent and adequate gaps occur in the traffic stream which will permit one or more children to safely cross the roadway, then that school crossing could be classified as "safe." When traffic flows become more dense and a critical point is reached above which adequate and frequent gaps are no longer available for the pedestrian, then the school crossing can no longer be classified as "safe." It can therefore be seen that there are two general degrees of hazard with which a school crossing may be rated, either the crossing is "safe" or it is "unsafe." If a technique can be developed which will accurately indicate whether or not frequent and adequate gaps are available in the traffic flow at any particular crossing, then that croshsing can be rated as to its degree of hazard.

Education and Enforcement Responsibilities

The above premise on which the determination of the degree of hazard is based assumes that engineering, education and enforcement will share their respective responsibilities in obtaining safety at school crossings. The assumption that a school crossing is "safe" just because there are frequent and adequate gaps in traffic is illogical unless traffic law enforcement agencies enforce the laws in the vicinity of schools, and unless the schools and the parents properly instruct the children in safe walking and bicycle riding practices and see that they practice them. It is necessary to assume that children, of elementary school age and older, have been trained and have had sufficient experience in safe habits if we are to hold engineering and other safety measures within the bounds of reason.

Application of the Degrees of Hazard

The engineer should make use of the two degrees of hazard as a means of making decisions and recommendations for engineering treatment at school crossings. Where study reveals that a school crossing can be rated in the "safe" classification, then the engineer should recommend such safety "assists" as: warning signs, pavement markings and, best of all, the use of the school safety patrol. Where study indicates that the crossing is of the "unsafe" classification

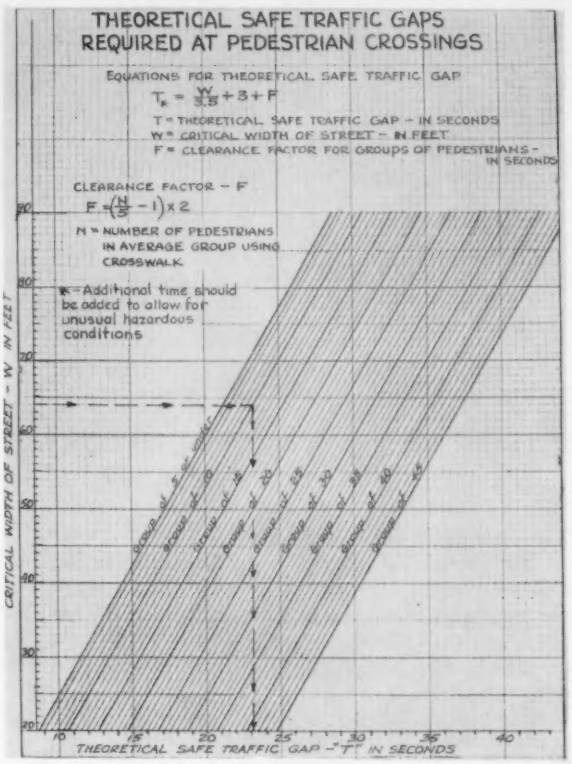
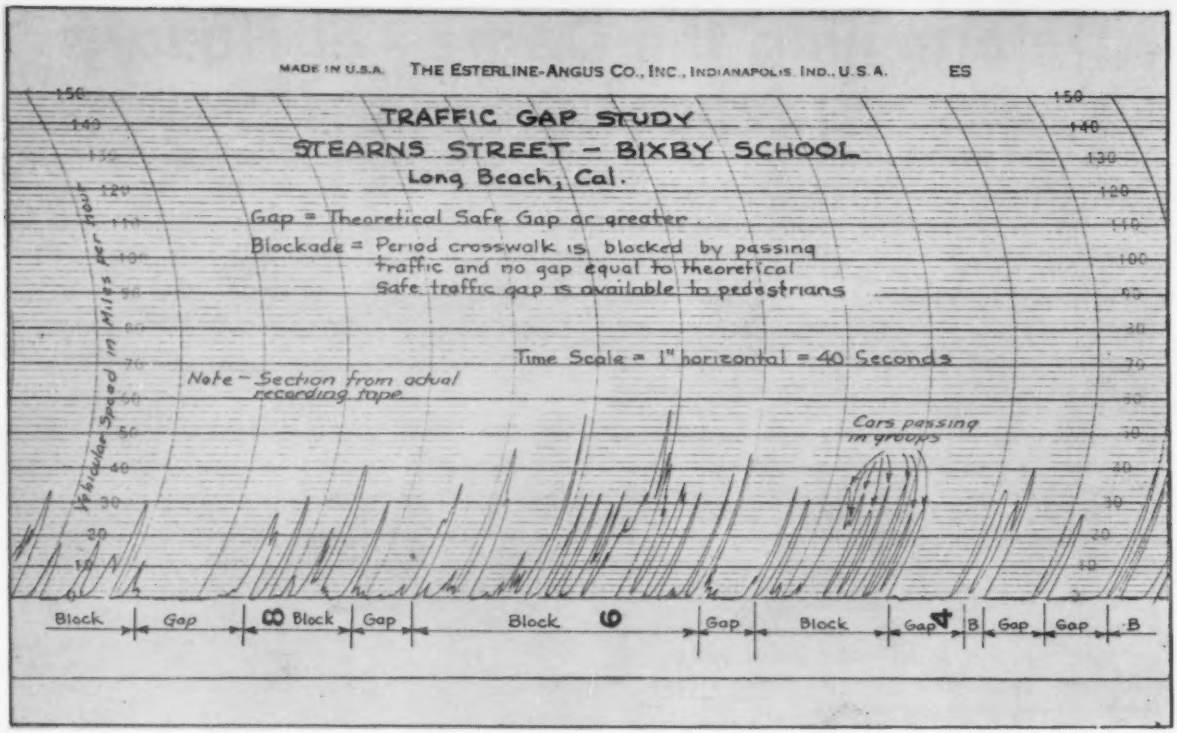

THEORETICAL SAFE TRAFFIC GAPS
REQUIRED AT PEDESTRIAN CROSSINGS
EQUATIONS FOR THEORETICAL SAFE TRAFFIC GAP
$T_p = \frac{W}{3.5} + 3 + F$
T = THEORETICAL SAFE TRAFFIC GAP - IN SECONDS
W = CRITICAL WIDTH OF STREET - IN FEET
F = CLEARANCE FACTOR FOR GROUPS OF PEDESTRIANS - IN SECONDS
CLEARANCE FACTOR - F
$F = \left(\frac{N}{5} - 1\right) \times 2$
N = NUMBER OF PEDESTRIANS IN AVERAGE GROUP USING CROSSWALK
* = Additional time should be added to allow for unusual hazardous conditions
CRITICAL WIDTH OF STREET - W IN FEET
THEORETICAL SAFE TRAFFIC GAP - "T" IN SECONDS

Fig. 1

then it becomes necessary to recommend those treatments which either artificially make the necessary safe breaks in traffic or which eliminate the hazard problem altogether. These would take the form of traffic signals, police officers, crossing guards, pedestrian grade separations or the development of a more adequate safe routing plan for the school children. This type of engineering analysis will provide a sound and economical approach to the school crossing hazard problem.

Determining the Degree of Hazard

From the foregoing, it can be seen that the engineer must develop a technique for determining whether the traffic stream at a particular school crossing has adequate and frequent gaps. Just as a carpenter would measure a piece of wood with a yardstick to determine if it is the proper length, so must the engineer measure the natural gaps in traffic to determine whether they are the proper length to permit a safe crossing of the roadway by a pedestrian. The safety "yardstick" to be used is a time interval which will be termed the "theoretical safe traffic gap."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TRAFFIC GAP STUDY
STEARNS STREET - BIXBY SCHOOL
Long Beach, Cal.
Gap = Theoretical Safe Gap or greater.
Blockade = Period crosswalk is blocked by passing traffic and no gap equal to theoretical safe traffic gap is available to pedestrians
Time Scale = 1" horizontal = 40 Seconds
Note - Section from actual recording tape
Cars passing in groups
Vehicular Speed in Miles per Hour
Block
Gap
Block
Gap
Block
Gap
Block
Gap
B
Gap
Gap
B

Fig. 2

The Theoretical Safe Traffic Gap

The "theoretical safe traffic gap" may be defined as the time interval required by one or more children to observe and analyze the hazard situation created by approaching vehicles, and to walk across the roadway to a point of safety on the opposite side, before the approaching vehicles can reach the crosswalk.

The equation for the "theoretical safe traffic gap" would be:

$$T = \frac{W}{3.5} + 3 + F$$

where T = "theoretical safe gap"; W = critical width of pavement to be crossed by pedestrian, in feet; and F = the additional time to clear groups of pedestrians, in seconds. The factor 3.5 represents the walking speed of children in feet per second; and the 3 factor represents the number of seconds required for children to observe and commence their crossing maneuver. The factor "W" is calculated as follows:

1. Pavement with parking on both sides. W = curb to curb width minus 7 feet.

2. Pavement with parking entirely prohibited or prohibited on one side. W = curb to curb width.

3. Divided highway with no parking or with parking at the outer curb. W = curb to curb width of one roadway.

4. Divided highway with narrow center island unsuitable for the largest group of children. W = width of pavement between outer curbs of the divided highway.

The factor F is calculated from the formula

$$F = (\frac{N}{5} - 1)2$$

where N is the number of children in an average group.

In order to simplify the determination of the "theoretical safe traffic gap" a graph has been prepared (Fig 1) which may be used after factor "W" and the number of children in an average group have been determined.

Measurement of Gaps in Traffic

Having acquired a safety "yardstick" with which to measure the adequacy of gaps in the traffic stream, it next becomes necessary to devise a technique for determining the length of the actual gaps in traffic so they can be analyzed. Vehicles crossing consecutively over a school crossing create gaps or time intervals between vehicles which often range from very short to long intervals. Those gaps which are found to be equal to or greater than the "theoretical safe gap" are considered "safe" gaps. The time period between consecutive safe gaps will be called the "blockade" which may contain one or more "unsafe" gaps. A number of methods are possible for measuring gaps in traffic, a number of which are as follows:

Stop Watch Method

This method requires the use of only a stop watch and two survey personnel. One person is used to read the stop watch and call out the time readings; the other acts as a recorder and records the readings. The stop watch is started and run continuously. As each vehicle crosses the crosswalk, the elapsed time is read and recorded. By simple subtraction, the time intervals between consecutive vehicles are measured in seconds. The stop watch method is economical from an equipment standpoint but requires at least two personnel to accomplish.

The Graphic Recorder Method

This method requires the use of a graphic recorder similar to the Esterline-Angus multi-pen recorder, the cost of which is approximately $450.00. A pushbutton is rigged to the recorder for the purpose of actuating a recording pen.

The recording tape mechanism is adjusted to a speed of 1½ inches to the minute and started in motion. As each vehicle crosses the crosswalk, the operator pushes the pushbutton and instantaneously registers each vehicle on the recording tape as a series of verticle ink marks. The distance between ink marks is the time interval of the respective traffic gaps. This method is accurate and economical from a personnel standpoint inasmuch as the survey can be accomplished with one person.

The Radar Speedmeter - Graphic Recorder Method

This method requires the use of the Radar Speedmeter and the Esterline-Angus graphic recorder, the total cost of which is approximately $1200.00. The radar speedmeter is set up along the *left edge of the pavement* with approaching traffic in the near lanes. The detector is beamed diagonally across the pavement at an angle of approximately 40 degrees with the edge of the pavement. At this angle, all vehicles moving along the roadway in both directions will actuate the recording pen of the graphic recorder. It has been determined that the error in gap timing due to the spread of the radar field is negligible. The graphic recorder mechanism is operated at a speed of 1½ inches per minute. As each vehicle passes through the radar field it actuates the pen in the recorder which in turn records each vehicle as a peaked line on the recording tape. See Fig. 2. The time distance in seconds between the beginning of successive peaks is the traffic gap. This method has numerous advantages such as: it requires only one field man; it provides a speed survey; it gives a traffic count; the equipment operates itself, thus permitting the operator to make pedestrian counts or other related surveys, and, in general, it obtains a maximum of data with a minimum of time and personnel.

Analyzing the Degree of Hazard

The degree of hazard at a particular school crossing will depend to a large extent on two characteristics of the traffic stream; first, a lack of safe gaps having time intervals equal to or greater than the "theoretical safe traffic gap," and; second, the existence of long "blockade" intervals between consecutive safe gaps which would encourage impatient children to take a chance on crossing the street during a hazardous period. In other words, there are three possible conditions of the traffic stream on which a crossing could be rated as to safety:

1. Where no "safe" gaps are available, the crossing would be rated *"unsafe."*

2. Where "safe" gaps are available but long intervening "blockade" intervals exist, the crossing would be rated *"unsafe."*

3. Where "safe" gaps are available and the intervening "blockade" intervals are acceptable to the pedestrian, the crossing would be rated *"safe."*

It can be seen that, if the field studies indicate conditions No. 1 and No. 3 there is no problem in rating the crossing. It can also be seen that in condition No. 2, the "blockade" interval is the controlling factor in rating safety at a school crossing. It would therefore appear that if the delay caused to the school children by the "blockade" intervals could be compared with some acceptable standard for a maximum desirable pedestrian delay interval, then a definite safety rating could be given to the crossing.

The crux of the safety analysis lies in the standard which will be used for the maximum pedestrian delay interval. Some engineering authorities believe the interval should be

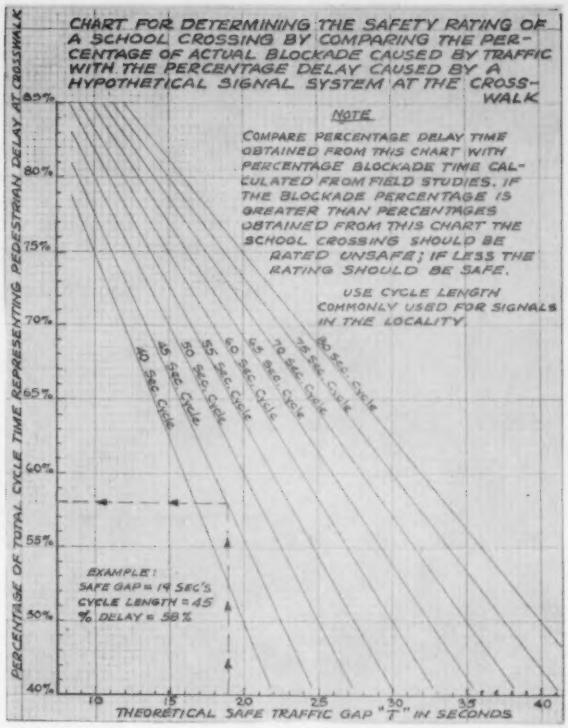
CHART FOR DETERMINING THE SAFETY RATING OF A SCHOOL CROSSING BY COMPARING THE PERCENTAGE OF ACTUAL BLOCKADE CAUSED BY TRAFFIC WITH THE PERCENTAGE DELAY CAUSED BY A HYPOTHETICAL SIGNAL SYSTEM AT THE CROSSWALK
NOTE
COMPARE PERCENTAGE DELAY TIME OBTAINED FROM THIS CHART WITH PERCENTAGE BLOCKADE TIME CALCULATED FROM FIELD STUDIES. IF THE BLOCKADE PERCENTAGE IS GREATER THAN PERCENTAGES OBTAINED FROM THIS CHART THE SCHOOL CROSSING SHOULD BE RATED UNSAFE; IF LESS THE RATING SHOULD BE SAFE.
USE CYCLE LENGTH COMMONLY USED FOR SIGNALS IN THE LOCALITY
PERCENTAGE OF TOTAL CYCLE TIME REPRESENTING PEDESTRIAN DELAY AT CROSSWALK
85%
80%
75%
70%
65%
60%
55%
50%
40%
40 Sec. Cycle
45 Sec. Cycle
50 Sec. Cycle
55 Sec. Cycle
60 Sec. Cycle
65 Sec. Cycle
70 Sec. Cycle
75 Sec. Cycle
80 Sec. Cycle
EXAMPLE:
SAFE GAP = 19 SEC'S
CYCLE LENGTH = 45
% DELAY = 58%
10
15
20
25
30
35
40
THEORETICAL SAFE TRAFFIC GAP "T" IN SECONDS

Fig. 3

60 seconds. Observations of pedestrian reactions at signal locations indicate an impatience when they are required to wait as long as 40 seconds. The latter suggests a possible standard that might be used. Since it is quite common for pressure groups and others to demand traffic signals at school crossings, why not base the maximum acceptable delay standard on the basis of the delay that would be caused if signals were installed at this crossing. These signals would be timed so as to provide a cross-street green and yellow interval equal to the time interval required for one or more children to cross the street safely or, in other words, equal to "T," the "theoretical safe traffic gap." The green and yellow interval on the main street would therefore represent the maximum pedestrian delay interval that should be used as the standard of measurement for safety. A comparison of the percentage of total blockaded time, obtained from the field survey, with the percentage of main street green and yellow time in a hypothetical signal cycle, may then lead to a safety rating as follows: if the percentage blockade is *less than* the percentage delay that would be caused by the signals, the crossing would be rated *"safe"; if greater,* the crossing would be rated *"unsafe."* Fig. 3 offers a handy chart for the rating of school crosswalks.

Comparison of Methods for the Determination of Hazard

In the past, a number of techniques and equations have been devised for the determination of the degree of hazard at school crossings. Following is an analysis of hazard at two different school crossings in the City of Long Beach based on four different methods of analysis, including that advanced in this discussion:

(Continued on page 153)

Parking Lots For Secondary Shopping Centers

Herman M. Batts, Jr. (Jun. Mem., ITE)
Traffic Engineer, Municipal Parking Authority, Detroit, Michigan

The 128-stall Grand River-Joy Road Parking lot.

DETROIT HAS EMBARKED on a program of providing off-street parking facilities in the major outlying shopping centers within its city limits. Detroit's master plan of land use lists thirty-eight such outlying business centers. Many of these districts were developed at a time when the parking of automobiles did not pose a problem. Today many of these centers lack adequate parking facilities.

The amount of parking needed was established on the basis of the type of business and the amount of floor area of each building in the district. The overall ratio of parking space needed per square foot of floor area was slightly less than 1 to 1. This ratio does not meet the normal design requirements for new shopping centers, but is intended to establish the minimum parking requirement.

The City of Detroit has two outlying parking lots in operation at the present time. The first of these is the Grand River-Joy Road Community Shopping Center opened in June of 1953. This lot has a one hundred and twenty-eight stall capacity.

The land on which this lot is constructed was formerly occupied by a neighborhood theatre which had been closed and a used car lot. The capital costs as shown in Table 1

A "before" and "after" (on Sunday) view of the Livernois-Seven Mile area parking lot.

totaled $877.37 per parking space. The development cost of $306.85 included an asphalt surfacing consisting of a six-inch (6″) base course and an inch and a half of asphalt penetration course, the erection of a modern attendants' shelter with washroom facilities and installation of modern street lighting type equipment.

The second of Detroit's two municipal parking lots serving outlying business districts is located in the Livernois-Seven Mile Shopping Center. This lot has a 360-vehicle capacity and was opened on July 15, 1953. The total capital cost (Table 1) amounted to $1,036.16 per parking space incorporating the same type of design standards.

TABLE 1

CAPITAL COSTS BREAKDOWN

	Livernois-Seven Mile Parking Lot	Grand River-Joy Road Parking Lot
Capacity	360	128
Land Cost	$274,082.45	$ 73,026.20
Development Cost	98,935.91	39,277.19
Total Cost	373,018.36	112,303.39
Land Cost/Stall	761.34	570.52
Development Cost/Stall	274.82	306.85
Total Cost/Stall	1,036.16	877.37

DEVELOPMENT COST BREAKDOWN

Tree Removal	$ 790.16	
Grading, Paving	67,661.47	$ 26,225.01
Water and Drainage	5,491.48	2,360.89
Curbing, Block Wall	9,928.47	2,077.78
Lighting	8,155.73	3,817.08
Shelter, Signing	4,182.51	4,796.43
Landscaping	2,726.34	
Total	$98,935.91	$39,277.19

The construction of the Livernois-Seven Mile lot required the condemnation of 12 moderately priced homes and 12 vacant residential lots, a total assessed value of $106,110. One of the major reasons for the establishment of municipal parking lots in the outlying shopping centers where parking shortages exist is to arrest the downward trend of the tax base in these centers. While the Livernois-Seven Mile Area had not reached the point where this problem was serious, it is significant that the assessed values of the commercial property in the area increased a total of $644,000 as a result of increased values and building modernization within one year after the opening of the municipal parking facility.

The parking fees charged at both lots are 10c for the first hour and 5c for each additional hour. No maximum has been placed in effect for daytime usage as the lots are intended to serve the shopping public. The Grand River-Joy Road lot has a 20c night rate. The average daily turnover on the 128-car lot was 2.6 during the first quarter of 1954. The average daily turnover for the 360-car lot was 1.7 for the same period. The variation in average daily parking acts by days of the week is shown in Figure 1, in both cases the retail shops in the area are open on Thursday and Friday nights. In the Grand River-Joy Road area the stores are also open on Saturday nights.

The variation of the average daily parking acts by month for the last quarter of 1953 and the first quarter of 1954 is shown in Figure 2. The effect of the Christmas shopping load was very evident. On the Saturday before Christmas, the 128-car lot at Grand River-Joy Road handled 1,235 cars for a peak turnover of 9.6. The 360-car lot at Livernois-Seven Mile on the same Saturday parked a total of 1,783 cars for a peak turnover of 5.0.

In both cases the lots were so designed to facilitate high turnovers with a minimum of congestion. The Livernois-Seven Mile lot parking spaces are set at an angle of approximately 55 degrees in parking bays fifty-five feet in width. The parking stalls are 8½ feet wide.

The Grand River-Joy Road parking lot has a combination of right angle and 60 degree angle parking. The parking stalls, predominantly right angle stalls, are 9 feet wide. The parking bays are approximately sixty feet in width. In both of these lots liberal design standards were followed to provide for the most effective and least congested traffic movement. With more than a quarter of a million parking acts in the first year of operation on these two parking lots there has been but one claim for vehicular damage.

The Livernois-Seven Mile parking lot had a gross income of $21,079.35 between July 1, 1953 and June 30, 1954 as shown in Table 2. The total operating expenses amounted to $8,655.59 for a net operating income of $12,809.03. The total cost of this lot as well as the lot at Grand River-Joy Road has been paid for out of parking meter receipts.

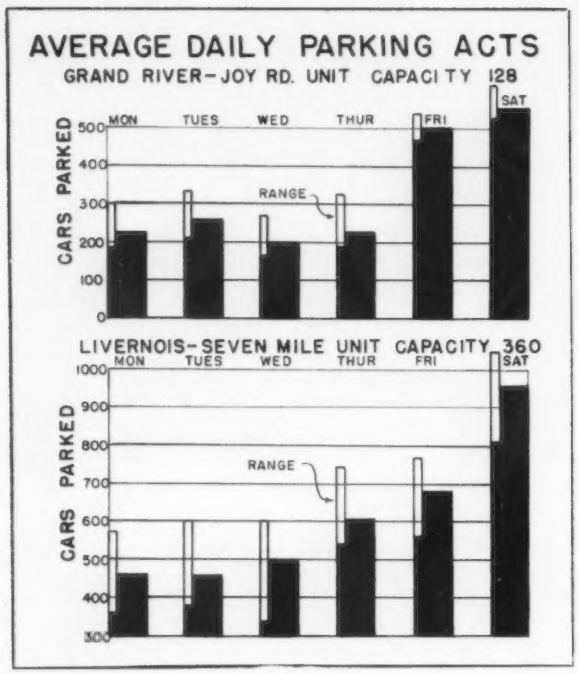

Fig. 1

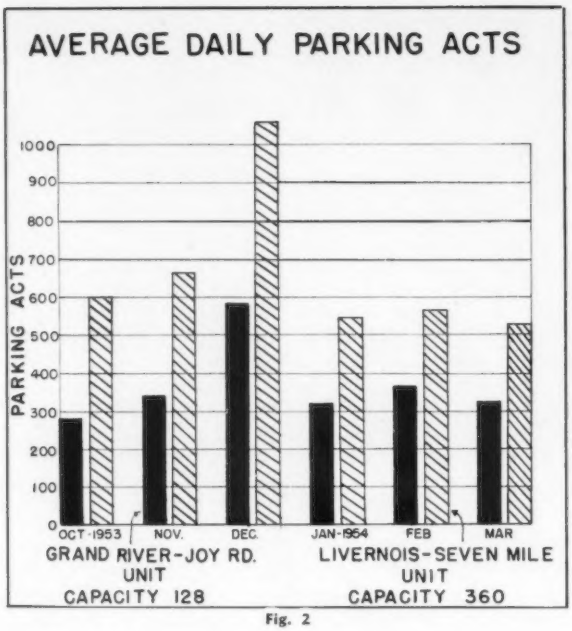

Fig. 2

TABLE 2

OPERATING STATEMENTS

July 1, 1953 through June 30, 1954

	Livernois-Seven Mile	Grand River-Joy Road
Capacity	360	128
Parking Acts	166,526	97,535
Gross Income	$21,079.35	$12,958.90
Wages	5,177.06	4,688.73
Payroll Taxes	199.79	143.53
Insurance	369.40	215.39
Electricity	383.97	457.74
Tickets	469.53	191.99
Retirement	58.34	50.00
Uniforms	132.02	45.47
Management Fee	1,725.00	1,500.00
Total Operating Expenses	$ 8,655.59	$7,424.80
Net Operating Income	$12,809.03	$5,534.10

The gross income of the Grand River-Joy Road parking lot (Table 2) was $12,958.90 during the same period. The total operating expenses were $7,424.80 leaving a net operating income of $5,534.10.

The average parking fee for the two lots is shown in Table 3. At the Livernois-Seven Mile lot the average parking fee was 12.7 cents. The expenses were 3.1 cents for wages, 1.0 cents for other expenses, and 1.0 cents for management fee; leaving a net operating income of 7.6 cents per parking act. The average parking fee at the Grand River-Joy Road parking lot was 13.3 cents. The expenses were 4.8 cents for wages, 1.3 cents for other expenses, and 1.5 cents for management fees; leaving a net operating income of 5.0 cents per parking act.

TABLE 3

AVERAGE PARKING FEES

	Livernois-Seven Mile Parking Lot	Grand River-Joy Road Parking Lot
Average Parking Fee	12.7c	13.3c
Wages	3.1c	4.8c
Other Expenses	1.0c	1.3c
Management Fee	1.0c	1.5c
Net Operating Income	7.6c	5.7c

The slightly higher average parking fee received at the Grand River-Joy Road lot is due to the night-time parkers who pay a straight 20-cent fee.

During the next year the Municipal Parking Authority plans on constructing parking facilities in four more outlying business districts. The estimated costs and capacities of these facilities are shown in Table 4.

TABLE 4

1954-1955 CONSTRUCTION PROGRAM OUTLYING MUNICIPAL PARKING LOTS

Area	Capacity	Estimated Cost
Michigan - Junction	166	$181,000
Harper - Chalmers	327	171,000*
Livernois - Fenkell	262	206,000
Harper - Van Dyke	290	326,000
Total	1,045	$884,000

*Property partially owned by city.

It is planned to install parking meters on the first two lots listed. We hope then to be able to compare the economics and degree of public acceptance of both metered and attendant parking lots.

15 Years Rural Freeway Construction

By Walter Hodel

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Chicago, Illinois

This report was prepared by Mr. Hodel as the final requirement of one of Professor John C. Kohl's graduate courses at the University of Michigan last year. Mr. Hodel received his undergraduate technical training in Germany and had some practical highway experience there before coming to the United States. Last February he received his MSE (Civil) degree from the University of Michigan.—EDITOR.

Preface

I consider it to be very unfortunate that the term to describe the type of highway in this study—Freeway—seems to exclude those facilities on which toll is collected. Europeans were more fortunate in their choice of a term. The Italian Autostrade, the German Autobahn, the French L'Autoroute, and the English idea of a Motorroad are expressions to describe the physical features of the road. None of the terms offers the ambiguity of their American counterpart.

A freeway is a highway with full control of access and with all crossroads separated in grade from the pavements for through traffic. A controlled access highway is a highway on which abutting property owners have no right, or only a limited right, of direct access and on which the type and location of all access connections are determined and controlled by the highway authorities.[1] This definition, no doubt, intends to group together both public facilities and toll roads, contrary to the general usage. It is in this sense that the term was used in this paper.

The scope of the paper made it necessary to restrict the study to Rural Freeways. No attempt has been made to include the urban-arterial and urban-bypass freeways since they pose more heterogenious problems in each individual case.

INTRODUCTION

FOR THE HISTORY of the type of highway under discussion we need to go to Continental Europe. In the early 1920s the Italian Autostrades were built. Its essential idea was a motor road fenced off rigorously from the surrounding country throughout the entire length, access to be provided only by gates, even if toll free; no crossings on the level either by road or rail was to be permitted. Here for the first time we have the two essential factors of a freeway, controlled access and separation of grades.

This new concept caused much enthusiasm among the delegates to the International Road Congress held in Milan, Italy, on the invitation of the Italian Government in 1926. Mr. Jeffreys, an English authority of highway engineering and administration recalls:

"A resolution . . . was carried by the votes of the continental delegations, expressing the hope that special motor roads would be built connecting the capital cities and the principal resorts of Continental Europe. In such an atmosphere the position of the British and American delegates was one of some difficulty. To oppose the recommendations . . . would have been ungracious and useless; to agree to them was plainly outside the authority of the official delegates of Great Britain and the United States."[2]

The Motorstrade then in existence was the connection Milan-Varese (31 miles) with branches to Como (15 miles) and Siesto and the Simplon (7 miles). There have been no additions since 1937 when 8 Autostrades were in existence, the longest connecting Milan with Turin (78 miles). Although in Italy the motorroads never amounted to a coherent net, it was there that a new concept crystallized into reality.

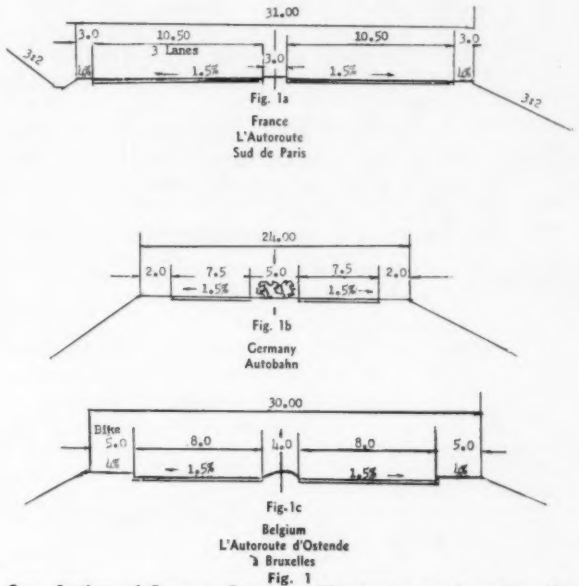


Fig. 1
Cross Sections of European Freeways. All measures are in meters. (1m 3.2808 ft.)

Much more vigorously the freeway idea was pushed in Germany where beginning in 1934 the construction of the Autobahn started. Mr. Hewes, United States, in the closing session of the VII International Road Congress, held in Munich, Germany, expressed his appreciation for "the scope and magnitude of the Autobahnen program and the vigor with which it was progressing."
Oberthur, Paris-Rennes 1935, p. 278.

An unofficial British delegation, organized by the British Road Federation was invited to review the progress that had been made in the construction of the Autobahnen in 1937 by the German Inspector General. At this time from the 6250 authorized miles, 950 miles were open for traffic, 1120 miles were under construction. Plans had been approved for 1150 miles, and 1080 miles were waiting survey.[4] The delegation in its summarizing report cited the following advantages of the Autobahnen:

1. The system as a whole secured the maximum capacity for main road communication involving a minimum mileage

[1] U. S. Government Printing Office. *Highway Practice in the U. S.* Washington, D. C. 149, pp. 45, 46.
[2] Rees Jeffreys. *The King's Highway.* London 1949, Batchworth Press Ltd., pp. 123, 124.
[3] *VII. International Road Congress, Munich 1934,* Proceedings,
[4] Rees Jeffreys. *op. cit.* p. 125.

of new construction and capital outlay.

2. The routes were located at distances from the large towns they served and upon land generally involving the least cost of acquisition and compensation.

3. The maximum safety of movement and freedom of traffic flow were attained on these roads with a resultant relief to traffic upon the old road system.[5]

With specific reference to the engineering and technical side, Prof. R. G. H. Clements, a member of this delegation, in a separate report sees the advantages of the Autobahnen in the following points which because of their conciseness I should like to cite in full:

(a) Maximum safety of movement, to be attained by:
1. Total exclusion of pedestrians, cycle and animal traffic.
2. Complete separation of opposing traffic streams.
3. The elimination of the "collision points" arising from one traffic stream crossing another.
4. The use of over and under bridges to secure such separation.
5. The control of traffic at road junctions by clear and systematic layout for each class of intersection.
6. Provision of a clear and simple system of road signals.
7. No right of access from adjoining frontage lands.

(b) Maximum traffic flow and lowest cost of operation:
1. Uniform road surface of high standards and accuracy and performance.
2. Minimum tractive resistance by easy gradients, ample curves and super-elevation where necessary.
3. The highest obtainable standards of visibility.
4. Provision of parking places and lay byes off the highway.

(c) Aesthetic advantage:
1. Careful attention to cause least disfigurement of landscape.
2. Moulding of formation earthworks, etc., so as to blend with landscape.
3. Total absence of advertisement display both upon the roads and adjoining lands.
4. No telegraph poles, standards or other "foreign" structures permitted upon or in relation to a line of route.
5. All buildings for the service of the road, rest houses, petrol and repair stations, etc., to be of simple type laid out to harmonize.[6]

At the present time the Autobahn net in Germany has a length of about 3000 miles. The existing net is to be enlarged in accordance with an Interstate Road System agreed upon in 1949 by the West European countries.

In Great Britain a special road bill became law in May 1949 providing for roads reserved for special classes and designed to freeway standards. There does not exist yet a motor road net, but a beginning has been made. The Liverpool-East Lancashire Road (25 miles) was completed in 1934. Since then the Glasgow-Edinburgh Road was built. Greater London at the present time has a total length of 266 miles of arterial freeway roads.[7]

Existing freeways in France are arteries out of the centers of Paris, Lyon, and Marseille, for each of which the length is not more than 12.5 miles. The Conseil General des Ponts et Chaussees, however, has established a program for the construction of motor roads in France comprising a length of 6000 km (3750 miles).[8]

A comparison between the design features of this planned road system with the ones used in the construction of the German Autobahn is given in Table I. They correspond very largely and can be considered representative for design criteria of present day freeway construction in continental Europe. Fig. 1a, 1b, and 1c are cross sections of European Freeways. (France, Germany, Belgium.)[9]

[5] Rees Jeffreys. *op. cit.* p. 125.

[6] Jeffreys, *op. cit.* p. 126.

[7] Jeffreys, *op. cit.* p. 131.

[8] Boutet. *L'Etat actuel de la Technique Routière,* 1951. p. 590.

[9] Boutet, *op. cit.* p. 600.

TABLE I

Comparison between design criteria of existing German and future French freeways.

Design Criteria	Topography flat	rolling	mountainous	
Design Speeds:	160 km/h	140 km/h	120 km/h	German and French
Horizontal Curve Radii				
France: min.	1000 m	600 m	500 m	
normal	2000 m	1200 m	700 m	
Germany: min.	1200 m	800 m	400 m	
normal	1800 m	1000 m	600 m	
Grade:				
France		no data available		
Germany	4%	6%	7%	
Vertical Curve Radii:				
Convex curves				
France: min.	10000 m	7500 m	5000 m	
normal	20000 m	15000 m	10000 m	
Germany:	16000 m	9000 m	5000 m	
Concave curves				
France:	10000 m	8000 m	6000 m	
Germany: min.	5000 m	3000 m	1000 m	
normal	8000 m	5000 m	3000 m	

1 km/h = 0.6217 mph 1 m = 3.2808 ft.

I

As far back as 1938 it was felt here in the U. S. that higher design standards had absolutely become necessary for a selected part of the road system. Reporting on the German Super-Highway System at the Institute of Traffic Engineers 9th annual meeting in 1938, Mr. John W. Poulter remarked:

"While there may be many reasons why such a system in all its details could not be built in this country, . . . we must do more things of a similar nature to meet the requirements for safe, high speed traffic."[10]

Unfortunately from the beginning of freeway constructions down to the present time, the controversy over the method of financing such facilities has overshadowed the fact that the facilities are necessary from the point of view of economical operations as well as safety wise. In my opinion toll roads and free roads are not opposed to each other but only different ways of arriving at the same goal, namely furnishing needed highways. "Toll Roads and Free Roads" a study made in 1939 by the BPR, which is cited still now in this controversy, proved only that toll financing of a transcontinental system with the traffic figures of the 1930's was unfeasible. Some parts already then were considered to be self-supporting. It could be charged that the toll road idea has gained momentum because of the failure to designate an Interstate Highway System and to implement the recommendations contained in the Design Standards for Interregional Highways, House Doc. No. 379, 78th Congress, 2nd session. The fact remains: While freeways could be constructed without toll collection and financed by a general tax levy, it appears that the taxpayer is sooner willing to pay tolls than to pay additional taxes for highway construction.

Toll road or free road, there is no doubt about the urgency of a freeway road system. In "Highways in Our National Life," Jean Labatut has aptly described the situation: [11]

". . . we can see somewhere in the United States along a two-lane highway the spectacle of two overloaded 20-ton freight cars trying to pass each other at 50 miles per hour, while an overstreamlined passenger car . . . only a few yards behind waits for an opening. . . .

. . . While the content is made up of oversized vehicles designed for high speed, the container (i.e. road) can be compared to an old leaky waterpipe which has burst and has been hastily repaired with sections of different diameters."

The most complete presentation of the present status of freeway projects in the U. S. appeared in *American Highways* last fall.[12] While there is an abundance of material as far as the toll roads are concerned, the material available for freeways constructed by the state authorities is very sparse. Because of the pay-as-you-go nature of construction in this latter case over a period of years, it is extremely difficult to ascertain the present status and location of freeway construction. The tabulation, therefore has no claim for completeness.

The role of the Federal Government among such a variety of public, semi-public, and private freeway authorities should become one of integration, to coordinate planning, design, and administration of these freeways into an efficient road system. Only then the freeways, combined into an entity, will be able to render optimum service.

[10] John W. Poulter, *The German Super-Highway System.* 1938 Proceedings 9th annual convention and sectional meetings, Institute of Traffic Engineers, New York. p. 76.

[11] Jean Labatut, *"Highways in Our National Life."* A Symposium, Princeton, New Jersey. Princeton University Press 1950, p. 472.

[12] From a reprint in American Highways, Oct. 1953, pp. 10, 11.

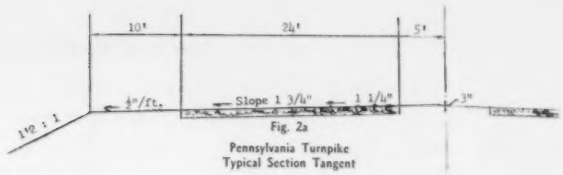


Fig. 2a
Pennsylvania Turnpike
Typical Section Tangent

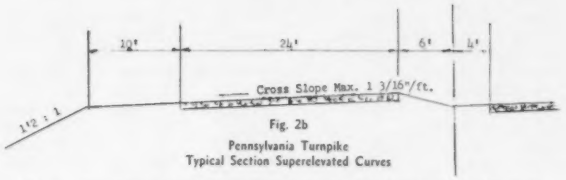


Fig. 2b
Pennsylvania Turnpike
Typical Section Superelevated Curves

Source: Proceedings of the Institute of Traffic Engineering 1939, pp. 41-45

II

Generally it can be said that the design features used for the present-day freeway construction follow to a large extent those for the National System of Interstate Highways, adopted by the AASHO on August 1, 1945.[16] Many specifications contain a statement to that effect. The design features of a specific freeway were compared to these specifications in Table II. The recommended design figures appear in brackets behind the actual ones. In order to detect any possible evolution of design features over the almost one and one-half decades of freeway construction, the tabulation was arranged chronologically.

A. Design Speed and Alinement

From the table it appears that all freeways conform to the recommendations of the AASHO. All Design speeds are in the recommended range between 75 mph and 55 mph. With the exception of the West Virginia Turnpike and the Connecticut Parkways, all design speeds were close to the recommended upper limit. Considering the ruggedness of the topography, even the West Virginia Turnpike must be considered of a high alinement standard. The parkways were adequate at the time of their construction; they are not sufficient for the present traffic load. None of the facilities were built with a lower standard as far as the alinement control is concerned.

B. Gradients and Sight Distances

In spite of the incompleteness of the data presented in Table II there can be observed a tendency for higher standards as far as the sight-distance is concerned. The newest of the facilities for example, the New York State Thruway, provides for a sight distance of 1000 ft., where the design of the Pennsylvania Turnpike had only 600 ft. While in the earlier freeways and parkways with the lower design speeds the sight distances compare favorably with those recommended by the AASHO, all facilities designed for 70 mph —with the exception of the New York State Thruway— fall short of the recommended distances, at any rate are not more liberal. As for free facilities, the standards of the Maryland State Highway Department are higher than those of the Ohio State Highway Department.

The gradients with the exception of the very early structures are around 3% or less, well within the recommended values. Only the Ohio State Highway Department's recommendations are somewhat less again.

[16] Interregional Highways, House Doc. 379, 78th Congress, 2nd session, Wash. 1944.

TABLE II

Alinement Control, Gradients, and Sight Distances

	Year Opened	Length	Design Speed	Alinement (Sharpest Curve)	Gradients	Sight Distance (1)	Remarks
Penna. T.P. Carlisle to Irwin	1940	160 mi.	60 mph	6°(2) (5°-6°)	3% (5%)	——	
Merritt Parkway, Conn.	1940		55 mph	7° (6°-7°)	7% (3%)	——	
Westchester Co. Parkways	1947	40 mi.	——	no data	——	——	
Maine Turnpike	1947	47 mi.	65 mph	1° (4°-5°)	4% (4%)	525′ (600′)	
Wilbur Cross Parkway, Conn.	1949	67 mi.	55 mph	no data	——	——	
Buccaneer Trail, Florida	1950	17 mi.		no data	——	——	
Penna. T.P. Eastern Ext.	1950	100 mi.	60 mph	3° (5°-6°)	2% (3%)	600′ (525′)	
New Hampshire Turnpike	1950	15 mi.		1°	2% (3%)	——	*N of Wood Ave.
Penna. T.P. Western Ext.	1951	67 mi.	70 mph	3° (3°-4°)	3% (4%)	600′ (700′)	60 mph
New Jersey Turnpike	1952	118 mi.	70 mph*	R 3000′ (3°-4°)	3% (3%)	600′ ** (700′)	
Denver-Boulder Turnpike	1952	17 mi.	65 mph	no data	——	——	**N of Wood Ave.
Turner Turnpike, Oklahoma	1953	88 mi.	70 mph	1°30′ (3°-4°)	3% (3%)	700′ (700′)	475 ft.
New York State Thruway	1954	535 mi.		2°	3% (3%)	1000′	
Garden State Parkway, N. J.	1955	165 mi.	50 mph		3% (3%)		
Maryland State Highway Dept.				Same as AASHO	Same as AASHO	525-700′ (525-700′)	
Ohio State Highway Dept.				Same as AASHO	4-6% (3-6%)	350-600′ (400-700′)	

Note: Figures in brackets are design values recommended by the AASHO.
(Alinement & Gradient figures presented as range between "Desired" and "Permitted.")
(1) Stopping Sight Distance.
(2) in exceptional cases (tunnel approach).

C. Cross Sections

In Fig. 2, Fig. 3, and Fig. 4 representative typical cross sections are shown. The recommendations of the AASHO call for 2 or 3 lanes respectively of 12 feet width in each direction, separated by a 15 feet wide median strip. Cross sectional characteristics are tabulated in Table III, indicating number and width of lanes, width of shoulders, width of median strip, width of Right of Way, and, wherever data were available, the slope of the pavement. As for width of Right of Way, the recommendations of the AASHO call for 300 feet. It is deemed necessary to provide 100 feet outside of the pavement edge "for the control of access, the landscape development, and the elimination of unsightly or distractive development, signs, etc., along the highway." [17]

No doubt, in the tabulated design features of the various cross sections there can be observed a trend to construct the facilities safer still, to provide for an adequate acquisition of Right of Way to insure control of access, and to plan into the future by designing the roadway for the addition of more traffic lanes. Most noteworthy is the widening of the median strip and the substitution of a raised mall with a depressed strip.

The lane widths have been 12 feet until now, with the exception of the 13′ lanes of the Merritt Parkway. Only recently the design for the New York State Thruway shows an increased width for the pass. traffic lane of 13 feet. When an outer lane is added, the total width of the pavement will be 2 x 37 feet. The increased width on the passing lane is to insure safer passing at speeds which are about 10 mph higher than the travelling speed of the car to pass. All of the major new freeways provide in the design of the structures for the ultimate addition of a third lane. This is true for the existing New Jersey Turnpike, and for the New York State Thruway, Garden State Parkway and the projects of the Maryland State Highway Dept.

The recommendation of the Design Standards for Interregional Highways for "10-feet shoulders to provide lateral space and adequate support for standing or disabled vehicles, clear of the road surface or pavement"[18] has been followed by all facilities after the raised curbs of the Merritt Parkway were cause for accidents. The New Hampshire Turnpike has 11′, the Turner Turnpike and the recommendations of the Ohio State Highway Department call for 12 feet wide shoulders.

The widths of Right of Way vary between 200′ and 300′. The Richmond-Petersburg freeway, a project designed in 1946/47 but not executed so far, showed a low 120′ width, however.

The transverse slopes run between 2″ for a 24-ft. pavement to a high of 4½″. The former was the design value for the Main Turnpike, the latter will be used in the typical cross section of the New York State Thruway. All other freeways—in so far as data were available—were designed with a 3″ crown.

The most striking evolution took place in the median strip design. From experience collected at the Pennsylvania Turnpike it was found that the opposing traffic streams ought to be separated more rigorously yet.[19] With few exceptions, all freeways constructed since, show a width of more than 20 feet. These exceptions are the 15′ wide grassed median strip of the Turner Turnpike, the 16′ width of the projected Richmond By-pass, and the recommended 16′ for the projects of the California and Ohio Highway Departments. The Maryland State Highway Department uses a liberal 30′-50′ median,[20] and the Garden State Parkway intends to separate opposing traffic lanes as far as 100′.[21] The design for the Indiana Turnpike calls for a 56′ median strip.[22]

Newer designs have abolished the raised mall in favor of the depressed median. Both the New York State Thruway and the Maryland State Highway Department's freeway construction of US 240 use a depressed median strip.* This

[17] Interregional Highways, House Doc. 379, 78th Congress, 2nd session, Wash. 1944.

[18] Interregional Highways, House Doc. 379, 78th Congress, 2nd ses-

[19] *Engineering News Record*, Oct. 18, 1951, "Are Toll Highways Accident Breeders?" By V. T. Boughton, pp. 30-33.

[20] *State Road Commission of Maryland* op. cit. p. 151.

[21] *Garden State Parkway*, 1st Annual Report — New Jersey Highway Authority 1952.

[22] *Engineering News Record*, Oct. 29, 1953, p. 23.

* A depressed median strip is also used in the Denver Turnpike.

sion, Wash. 44.

TABLE III

CROSS SECTIONAL CHARACTERISTICS

	No. & width of lanes*	Outer Shoulder	Width of Median	Width of R/W	Crown
Pennsylvania Turnpike Carlisle to Irwin	2 x 12′	10′	10′	200′	3″
Merritt Parkway, Conn.	2 x 13′	8′****	21′	300′	—
Westchester County Parkways	2 x 12′	"	"	no data	—
Maine Turnpike	2 x 12′	10′	26′	300′§	2″
Wilbur Cross Parkway	2 x 12′	no data	20′	no data	—
Buccaneer Trail	2 x 12′	"	no data	"	—
Pennsylvania Turnpike Carlisle to King of P.	2 x 12′	10′	10′	200′	3″
New Hampshire Turnpike	2 x 12′	11′	24′	300′	—
Pennsylvania Turnpike Irwin to Ohio line	2 x 12′	10′	10′	200′	3″
New Jersey Turnpike	2 x 12′ 3 x 12′**	10′	20′ (44′)***	300′§§ (250)	1/8″/ft.
Denver-Boulder Turnpike	2 x 12′	10′	20′ depressed	200′-400′	—
Turner Turnpike	2 x 12′	12′	15′	200′	1/8″/ft.
Richmond By-pass (project)	2 x 12′	10′	16′	120′	—
New York State Thruway	2 x 12′ and 1 x 13′	10′	20′ depressed	250′	3/16″/ft.
Garden State Parkway	2 x 12′ 3 x 12′	no data	100′	no data	—
Ohio State Highway Dept.	2 x 12′	12′	16′	200′	—
Maryland State Highway Dept.	2 x 12′	10′	30′-50′ depressed	200′	—
Cal. State Highway Dept.	2 or 3 x 12′	8′	16′	160-184′	—

* One direction.
** Constr. so 3rd lane can be added where it has not so far.
*** 44′ where 3rd lane has not been added yet.
**** Separated from pavement by 4″ raised curb.
§ Prohibition against outdoor advertising within 500 feet.
§§ North of Bonham Town 250′.

design apart from adding to the safety of the road permits a more simple transverse drainage across the roadway. (See Fig. 4.)

While the freeway character of design for the West Virginia Turnpike is debatable—it provides for one lane only in each direction—the feature of its creeping lanes deserve mention. The road carries traffic through mountainous topography on two 12′ wide lanes over a distance of 88 miles. On uphill grades with gradients of 3%, 4%, and 5% truck creeper lanes are provided with different lengths and of a width of 12′ to allow fast passenger cars to pass truck traffic. This economical design for rugged terrain is adequate, provided all passenger cars travel at about the same speed. The future needs to prove its adequacy as far as safety is concerned.

D. Interchanges

An interchange is a point of access for vehicles to enter and leave a freeway. It is also a system of interconnecting roadways in conjunction with a grade separation or grade separations providing for the interchange of traffic between two streets or highways on different levels.[23]

The number of interchanges is a function of the number and size of paralleling or intersecting highways, the composition of the traffic carried by the freeway (long or short distances), and the type of freeway financing. At the Pennsylvania Turnpike interchanges are provided at intervals ranging from 8 miles to 35 miles. In studies of the potential traffic on the New York Thruway System, it was found that the expected average passenger trip will average only 34 miles, fewer than 3% of the users will travel more than 200 miles at one time.[24] This, no doubt, indicates, that more interchanges than at the Pennsylvania Turnpike will be necessary to permit off and on movements of freeway users. These short trips probably account also for the proposal to use licenses instead of collecting tolls. Another example is the number of proposed interchanges for the Garden State Parkway—64 on a 165-mile length, more than 1 for every third mile—which will run in a 6-mile wide strip of land in which one-third of the total population of New Jersey lives.[25]

The most widely and commonly used type of interchange is the "Trumpet." Since most of the freeways are toll facilities, the convenience and economy of toll collection have been major factors in the interchange designs. The trumpet was found to offer the best solution. With minor variations due to the topography and the characteristics of the intersecting highway, this design was used as standard by the Pennsylvania Turnpike and most of the freeways built since, including the freeways in New Jersey (Garden State Parkway) and Ohio, now under construction. However, some of the interchanges along the Garden State Parkway provide an example of how involved the lay-out can become where more than one main artery is to be provided with on-and-off movements to and from the freeway.

[23] *Traffic Engineering Handbook*, Institute of Traffic Engineers, New Haven, Conn., 1950, definition on p. 471.

[24] Statement by Elmer B. Isaak, Eng. Firm, acting as consultant for the N. Y. Thruway Authority, cited in *Eng. News Record*, Oct. 29, 1953, p. 21.

[25] Garden State Parkway, op. cit.

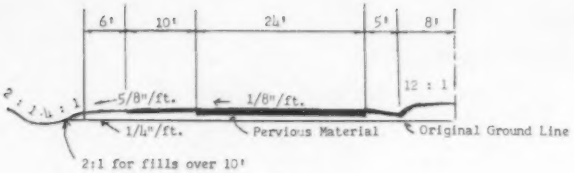


Fig. 3a
New Jersey Turnpike
Typical 2-Lane Cross Section

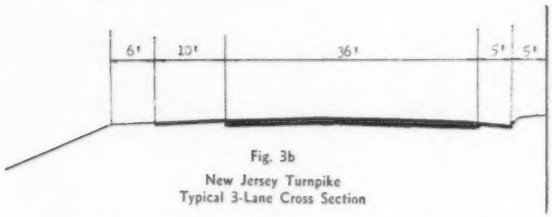


Fig. 3b
New Jersey Turnpike
Typical 3-Lane Cross Section

Source: New Jersey Turnpike Authority, 1st Annual Report 1949

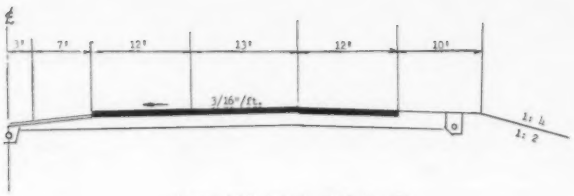
Interchange approaches are designed so as to provide good visibility. The location of interchanges along the Pennsylvania Turnpike were designed to be in the middle of a long sag providing for a sight distance of 600′ before reaching the deceleration lane.

The criteria for the ramp design are for all practical purposes a compromise between high ramp capacity and the economically feasible. Ramp capacity is a function of curve radii, therefore of space to be acquired for the interchange. A careful study will determine the ramp capacity necessary for a satisfactory traffic flow to and from the freeway. The ramp design values recommended by the AASHO provide for a Speed Change Lane with Transition Curve (preferably R = 125′), High Visibility Curb and extra width at the nose. The design speed on ramps is not to exceed 0.7 of the design speed of the freeway. A maximum gradient of 6% is recommended for up-movements, and 8% for down movements on ramps. For 1-lane ramps a width of more than 16′, for 2-lane ramps 26′, should be provided. Shoulders should have 8′ width (6′ minimum).

The available literature gives only a very sporadic picture as to how the actual ramp designs of freeways compare with these standards. The ramp curves of the Pennsylvania Turnpike are series of compound curves resembling loci of spirals. The New Jersey Turnpike ramps were designed with a maximum up-grade of 5.5% and downgrades of 5.0%. The Turner Turnpike shows radii of 250′ for its interchanges. All ramp lanes have a width greater than 12′. None of the freeways, to my knowledge, use colored acceleration and deceleration lanes.

Although not specified in the recommendations, most freeways provide for 1200′ acceleration and deceleration lanes. As for the length of the deceleration lanes, from a study undertaken at the Breezewood Interchange on the Pennsylvania Turnpike, it appears that most of the freeway users do not take advantage of the length provided. In this particular case it was found that a mere 29% of the drivers made the "Design Movement," that is, started the off-movement at the very beginning of the 1200′ long deceleration lane.[28] The author pointed out that these findings should

[28] J. V. Miller, Jr., *Traffic Engineering*, vol. XXI, p. 377, "A Deceleration Lane Study."



Source: ENR Jan. 23, 1947 pp. 103

Fig. 4
New York State Thruway.

not be used without further study of the matter. Nevertheless, the study is significant in that it shows an approach to the solution of a specific design problem.

III

Summarizing the design criteria of the various freeway facilities, it can be observed from the data presented in Chapter II, that its basic design concepts remained unchanged over a period of almost two decades of construction. This, per se, would prove the validity of a roadway net of freeway design. Some of the design features over the past show a clear evolutionary pattern, most noteworthy among them:

1. Higher Design Speeds with improved Sight Distances,
2. Wider Median Strips with a tendency to use a depressed one, rather than a raised mall, and
3. Providing for a possibility to add traffic lanes for traffic demands in the future.

It is my considered opinion, that these high design standards together with the concept of controlled access would render to the public an optimum return in spite of the high initial investment. We have arrived at a point where adding to the existing road mileage would not solve the highway transportation problem. There seems to exist an optimum density after which only improved design standards would improve the situation. If we compare the U. S. highway plant with the highway facilities of Germany, for example, a country in which the transportation situation has pointed toward the construction of the Autobahnen since twenty years, we will find the following striking ratios:[29]

TABLE IV

	Fed. Republic of Germany	U.S.
1. Veh./1000 sq. mi.	25,200	18,200
2. Veh./1000 mi. road*	29,800	28,900
3. Mi. of road/1000 sq. mi.	845	630

* Veh. include cars, trucks, and motorbikes. *Road Mileage*: Surfaced roads only.

The fact borne out in the figures of Table IX is, that only improved design standards will add to the adequacy of the road system, but not the construction of additional mileage. In the proposed bill for design standards for an Interregional Highway System,[30] it was pointed out that the proposed mileage of 34,000 adequately improved, would carry 20% of the total traffic, while representing only 1% of the total mileage.

Maximum traffic flow, however, is only part of the picture. The other part, in terms of costs, is reduced accident costs by providing safer highways. With increasing horse-

[29] Sources: The World Almanac & Book of Facts for 1953.
Commission Economique Pour L'Europe, Div. De Transports 1951.
Bulletin Annuel De Statistiques de Transports, Geneve 1952.
Automobile Facts and Figures 1952.

[30] Interregional Highways, House Doc. 379, *op. cit.*

power and increasing speeds the accident toll has steadily risen. A study by the Highway Research Board[31] shows that deaths on Rural Highways in 1951 made 71% of the total; it was only 50% in 1930. As for the types of accidents, the bulletin indicates an increase of rural two-vehicle collisions. While this type in 1930 accounted probably for 20% of rural deaths only, the proportion in 1940 was 38%, and in 1951 44%. A major increase, at least between 1940 and 1951, was shown in collisions at intersections where the figures stand for 8% and 12% of rural deaths, respectively. The bulletin states that, although too little information is available, the accident pattern of freeways does not fit the ordinary rural highway pattern.[32]

While the early freeways might have caused loss of alertness by their alignment with long tangents, these possible shortcomings have been eliminated in the newer structures. It has been recognized that monotony need be avoided in the freeways alinement. Opposing traffic streams have been wider separated since the earlier structures were accused to be accident breeders,[33] an accusation which never was proved. The Garden State Parkways Median will have a protective screen of foliage to shield drivers from head glare.[34]

The California State Department of Public Works, Division of Highways, committed to freeway design of the major portion of its state trunk lines where these correspond to the declared Interregional Highway System, since 1939, reviewing its experience with freeways, sees the advantage of freeway design in the following:[35]

1. *Greater Capacity.* Studies bear out that facilities with grade separations show a capacity of 75% - 100% higher than without.
2. *Higher Operating Speed.*
3. *Greater Safety.* Studies on 50 miles freeway show that the rate of fatal accidents is reduced to less than 25% of that on multi-lane facilities with intersections at grade.
4. *Greatest Possible Return On the Investment* to the public. The control of access eliminates encroachment and promiscuous entrances and exits.

---

[31] *Highway Research Board Bulletin* 74, "Traffic Accident Studies," Nat. Research Council, Wash., D. C., 1953: David M. Baldwin, "Traffic Accident Trends," pp. 4, 5.

[32] Highway Research Board Bulletin, *op. cit.*, p. 5.

[33] *Eng. News Record*, Oct. 18, 1951, V. T. Boughton, "Are Toll Roads Accident Breeders?"

[34] Garden State Parkway, 1st Annual Report. *op. cit.*

[35] Calif. State Highways, An Eng. Study, op. cit., pp. 49-52.

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Truck Weight Enforcement Stations in North Carolina

By James S. Burch (Mem., ITE)
North Carolina State Highway and Public Works Commission
Engineer of Statistics and Planning

This is a report which was presented to the Planning and Traffic Engineering Committee, Southeastern Association of State Highway Officials, Nashville, Tennessee, September 29, 1954.

IN THIS REPORT to the Committee, it is not my intention to explore the controversy which has existed for many years about the matter of legal truck axle limits and pavement damage. Rather, this will be more in the nature of a report of the experience of our State in its efforts to enforce statute laws with respect to truck weights. I would like to make it clear that I am not attempting to tell any other State what procedure it should follow, since I recognize not only the Sovereignty of States but also the fact that situations and conditions may be different in each State.

Background

During World War II, a number of changes occurred which, you will remember, were most adverse in terms of pavement damage. Because of the acute transportation shortage and the over-riding importance of the war effort, virtually all attempts at truck weight enforcement were abandoned. Trucks were given free rein as regards loading. Larger units with heavier axle loads were developed, bought and used. In many cases, statute laws were revised upward to permit increased loads. The result was that our pavements suffered considerable load damage during the war years. When it is recalled that the average Southern State had invested something like a billion dollars in its highway facilities, the serious aspect of widespread road damage is apparent.

The following is extracted from one of our reports on this subject:

> "Prior to 1951, there had been little attention paid to axle overloads, and general truck weight enforcement had been at a very low level.
>
> "The 1951 legislature fixed definite overweight penalties on an ascending rate scale (instead of fines), and authorized the building and operation of ten enforcement scale stations. The long established 18,000 lb. axle weight limit was retained. These stations began operations at various dates during the first half of calendar 1952, and their operations enlarged truck weight enforcement from an occasional and incidental function to a widespread continuous operation, having a decided effect in lowering the frequency of heavy axle loads passing our mobile survey stations."

Station Locations

The locations for these ten stations were very carefully chosen. They were not placed at State lines, but rather well within the State, so that their geographical area of influence would be within, rather than half outside the State. A study was made of truck use patterns over the entire State and segments of high usage were noted. Segments of routes which were difficult to by-pass were selected. River crossings were ideal examples of such locations. The final selections were made so that 28 "route points" were intercepted by the ten stations.

The operation of these stations is not directly under our State Highway Commission, but rather under the Commissioner of Motor Vehicles. The State Highway Commission handles the location, design, construction and maintenance; while the Commissioner of Motor Vehicles handles all operation and enforcement work.

Extent of Operations

For about the first year of operation, these stations worked on an 8 hour per day basis. Gradually the operations have been enlarged until they now operate on a continuous 24-hour basis, except for three 8-hour periods each week, at which times the stations are closed. These closed periods are not uniform, and are not known in advance, and are so staggered and irregular that truck operators never know when and where a station may be closed.

During the year 1952, these stations weighed 463,565 trucks. On the 24-hour operating basis in 1953, the stations weighed 1,717,358 trucks. We do not have a truck registration nearly as great as that figure, and this simply means that a large percentage of registered trucks in the State were weighed many times each during the year. Our 1954 rate of operations is about the same as in 1953.

The records of the stations themselves are indicative of decided improvement in legal compliance within a period of about two years. During the first half-year of operation, some 40 to 75 of every 1,000 trucks weighed were found to be illegal with respect to loading. This rate was progressively cut down until, for the last twelve months, *the rate has been reduced to about four illegal vehicles per 1,000 weighed.* At the same time, available data shows that the average gross weights and average payloads being hauled *have not been decreased.*

We believe that these facts are definite indication of the success of the program in that the same average tonnage per truck is being moved, but that the frequency of illegal loads is only 1/10th or 1/15th the original rate.

Another, and more exact, way of measuring the effect of this program comes, not from the station records, but rather from Highway Planning Survey loadometer operations at 25 other locations in the State. These data are statistically true, in that all trucks passing during operating hours are weighed and the data are factored to true averages. These data are not in terms of legal or illegal loads, but rather are in terms of frequency of axle loads in excess of 18,000 lb. per 1,000 trucks passing. These data show that the original rate of

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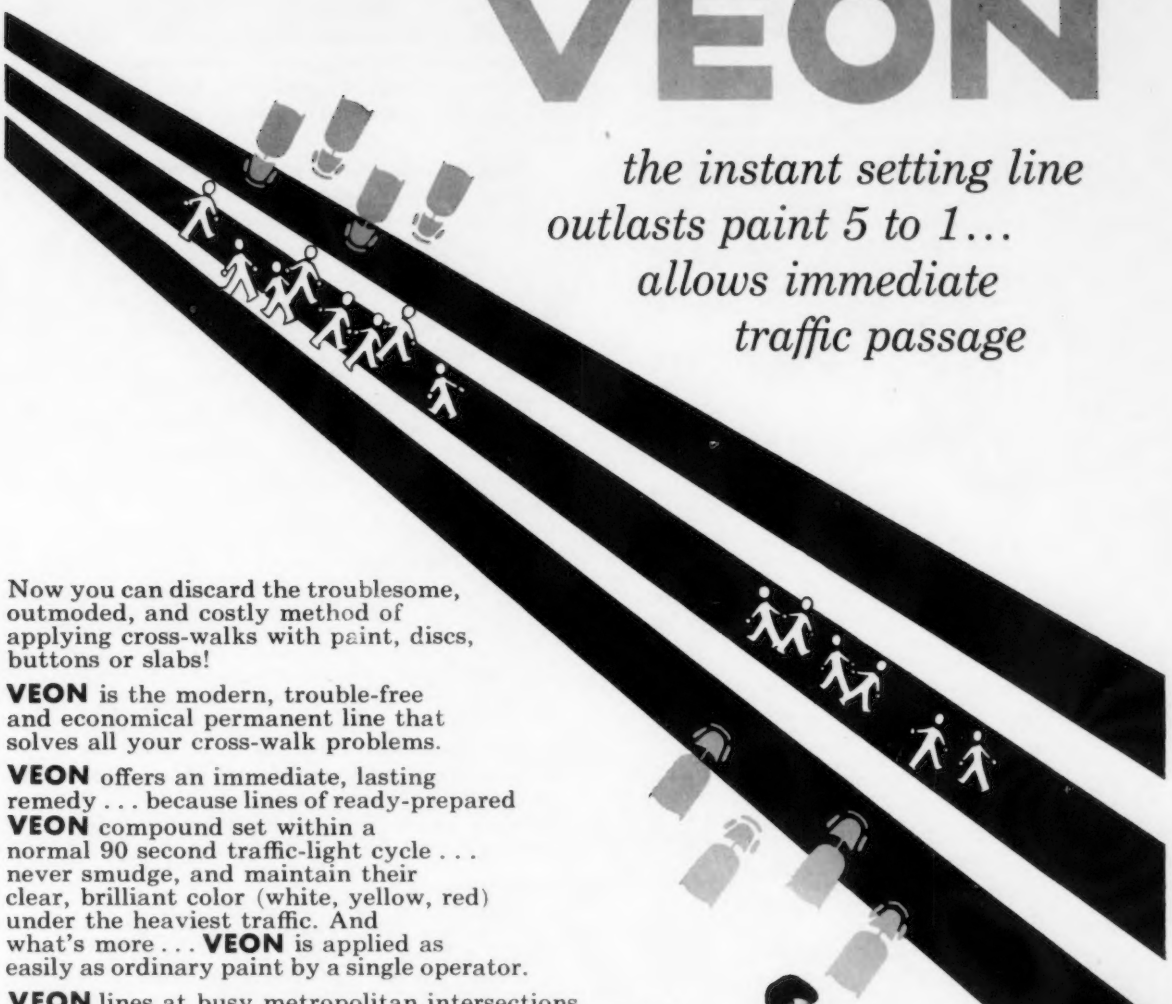

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about 22 has been progressively reduced to a current estimate figure of 7½ axles of over 18,000 lb. per 1,000 trucks passing. And, these are very seldom over 19,000 lb.

Self-Paying?

We are often asked whether or not the operations of these stations are self-paying in terms of the penalties which they collect, and the cost of their operation. In my opinion, this question is not important. The essential consideration is the protection of our vast and extensive highway mileage from excessive damage due to heavy axle loads. In my opinion, the State would gain, even if it never collected a nickle, provided the frequency of these heavy axle loads could be held down to the rate now prevalent in North Carolina.

However, if one wishes to apply the philosophy of self-sustenance, the following figures may be of value:

The capital outlay was about $25,000 for a station on one side of the road only, and about $35,000 for a double station, i.e., on both sides of the road. We have 7 double and 3 single stations, a total of 17 scales. The total capital investment was about $300,000.

The annual operating cost, on a 24-hour schedule, is about $337,000 for salaries, uniforms, heat, lights, water, telephones, etc., as a total for all ten stations.

The annual cost of maintenance, scale inspections, testing, adjusting units, and repairs is about $7,000 for all stations.

Thus, the annual operating cost is about $344,000. Since we weigh about 1,720,000 trucks each year, the unit cost to us is about 20c per truck weighed.

During calendar 1953, the ten stations collected $268,185 in penalties, and sold larger rated licenses to the extent of an additional $152,804. Thus, the stations were directly responsible for the collection of $420,989 in increased revenue to the Highway Fund. In addition, the stations were indirectly responsible for the sale of higher rated license plates in thousands of cases where operators voluntarily bought such larger licenses to comply with the law and avoid penalty. There is no way to put an exact dollar value on this aspect, but it is undoubtedly as large as the collections themselves.

When we consider all the direct collections of the stations of $420,989, as compared to the operation costs of $344,000, it is clear that the stations operations have not only been self-paying but have actually been profitable in terms of direct revenue.

It appears that this will not be the case in 1954, and that the stations will not be fully self-paying. To us, this is a very satisfactory situation, since the matter of revenue is so much less important than the accomplished fact of protection to the highways and bridges. Thus, we feel that the investment and the whole program have been altogether successful for its intended purpose. We also believe that it should be continued, for the same reason.

General Observations

It has been our observation that, prior to this Enforcement program, the vast majority of truck operators, including farmers, log haulers, and all others simply did not know the meaning of the truck weight laws. The matter of axle load, weight distribution and axle spacing were so complex and vague that they literally had no way of knowing the exact requirements of the statute, nor whether their loadings were in compliance with the law. As in any of the fields of Enforcement, we found that something like 95% of the truck operators were anxious to comply, once they understood.

Thus, a major early phase of this program was one of education, involving explanations, consideration, and patience. It is gratifying to know that these matters have been so well learned in our State that we have a violation index of only about 4 per 1,000: but with the average gross loads and average payloads as high as they were before the program was started. This is rather conclusive evidence that no operator, who made a reasonable effort to comply with the law, has been adversely affected by the program in his normal business operation. At the same time, the frequency of heavy axle loads has been reduced almost to the vanishing point, and the great investment in our Highway System has been accordingly protected. These facts in combination indicate that the investment and effort of this program have been eminently successful.

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(continued from page 139)

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(Note — I.A.C.P.—International Association of Chiefs of Police. I.T.E. — Technical Committee of the Institute of Traffic Engineers.)

Conclusion

There has been a general opinion among engineers that the methods developed in the past for the determination of the degree of hazard at school crossings have not been adequate and suitable for adoption as a standard. While these methods have, to a certain extent, taken decisions out of the realm of opinion and guesswork, there has been a feeling that they are too liberal and have resulted in the installation of unwarranted engineering and safety measures at some school crossings. The suggested technique and analysis offered in this discussion appears to have the simplicity and accuracy that would encourage its adoption as a uniform method for the determination of the degree of hazard at school crossings.

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Ted Siegel

TRAFFIC ENGINEERING MAGAZINE is pleased to announce the appointment of Ted Siegel, of Chicago, Illinois, as Managing Editor, with the major responsibility of procuring and editing technical articles. He will also handle several other departments of the magazine including Open Discussion, Reference Notes, Technical Council Activities, and Section News.

Ted will handle the editorial duties on a part-time basis outside of the normal working hours of his position as Traffic Engineer with the Traffic Division of the National Safety Council.

This arrangement will permit the Institute to supplement Mr. Siegel's present earning power in accord to some degree with his interest and tremendous assistance to the Headquarters staff. The contrary would have been the case if ITE had been fortunate enough to retain Ted in a full-time capacity as his present earning power is greater than the Institute's ability to pay.

The present Editor will continue to have overall responsibility, and will be directly responsible for the Traffic News, Strictly Business, ITE reports, etc., in addition to advertising and mechanical reproduction. The executive office of TRAFFIC ENGINEERING will remain at Strathcona Hall, New Haven, Connecticut, to which all editorial correspondence should continue to be addressed. Pertinent correspondence will be forwarded to Mr. Siegel.

Ted has been on the staff of TRAFFIC ENGINEERING for several years as an Associate Editor, and has continuously been interested in the operation of the magazine. He was the creator and first editor of ITE*MS, the monthly publication of the Midwest Section. For the past two years, he has been editor of the TRAFFIC ENGINEER'S TECHNICAL NOTEBOOK.

Born in Washington, Ted first became interested in Traffic Engineering while a Civil Engineering student at Tufts College, from which he graduated in October, 1944. After a year in the Pacific with the Seabees, he returned to civilian life and enrolled in the Yale Bureau of Highway Traffic in September, 1946. Three years with the State of New Jersey and two and a half years with the City of Chicago were excellent training for Ted's present position with the National Safety Council.

National Committee on Urban Transportation Announces Program

A program to eliminate traffic congestion, to improve street conditions, and to better mass transportation services in cities of all sizes throughout the country has gotten under way under auspices of the National Committee on Urban Transportation.

This program is the first concerted, nation-wide effort of its kind. It is aimed at helping cities get the facts needed to properly determine the deficiencies of urban transportation systems, to plan realistic programs to overcome these deficiences, and to present clear statements of needs to legislative bodies and the public.

That National Committee on Urban Transportation was formed last spring by six national organizations. These are the American Municipal Association, American Public Works Association, American Society of Planning Officials, International City Managers' Association, Municipal Finance Officers Association and National Institute of Municipal Law Officers.

The plan of attack on the transportation problem was outlined at a meeting November 29 in Philadelphia attended by municipal officials from all parts of the United States. The session was held during the meeting of the

(Continued on page 158)

McMonagle Appointed I. T. E. Vice President

The first action of the Institute's Board of Direction, meeting in Washington January 14-15, was to appoint J. Carl McMonagle Vice-President to replace the late Theodore M. Matson, who died in office December 15, 1954.

To replace Mr. McMonagle as Secretary-Treasurer, the Board appointed past president Thomas J. Seburn, long time Traffic Engineer for Kansas City, now research associate of the Yale Bureau of Highway Traffic. Mr. Seburn, who was president in 1946 and 47, consented to accept the new appointment only after informing the Board that he would not under any circumstances serve on the Board after the next regular election.

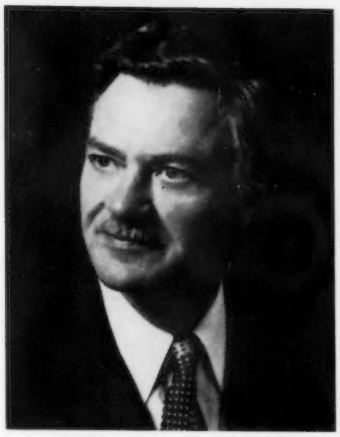
Yale Bureau Announces

The Committee on Transportation of Yale University on January 18 announced the interim appointment of Wilbur S. Smith as Acting Director of the Bureau of Highway Traffic, pending the appointment of a permanent director.

Fellowships at University of California

Two fellowships, each providing $2,000 for graduate study of highway transportation engineering, have been made available to the University of California by the Automotive Safety Foundation. Providing for one year's study, the fellowships are open to engineering graduates. Preference is given to applicants with experience in highway engineering subsequent to graduation, according to the University's Institute of Transportation and Traffic Engineering. Deadline for applications is February 15, for admission in the Fall of 1955. Application forms may be obtained from the Dean of the Graduate Division, University of California, Berkeley 4, Calif. Other information may be obtained from the ITTE, same address.

Cherniack Awarded PA's Distinguished Service Medal



Nathan Cherniack

Last October the Commissioners of the Port of New York Authority awarded Mr. Nathan Cherniack (past president ITE) its Distinguished Service Medal. Chairman Howard S. Cullman made the presentation with the following citation:

"One of the foremost transportation economists in the United States, Mr. Nathan Cherniack has been on the staff of the Port Authority for the past thirty-one years. During this time, his reputation has grown to a point where he is regarded as one of the nation's outstanding experts on the compilation and analysis of data on vehicular, passenger, and freight traffic movements.

Mr. Cherniack has directed and analyzed the vital surveys which determine the flow and pattern of vehicular traffic within the Port District. His theories on travel patterns have received important recognition and have formed the basis for the planning of transportation facilities constructed both by the Port Authority and other agencies within the Port District. Because of the stockpile of significant statistical data collected under Mr. Cherniack's direction, the Port Authority is always prepared to undertake major studies of highway, railroad, and marine transportation.

Through his Port Authority work, Mr. Cherniack has developed cordial working relationships with some fifty transportation agencies throughout the United States in order to compare and correlate statistics concerning the Port District with those for the rest of the country. His nation-wide professional stature was recognized by his colleagues in the Institute of Traffic Engineers, who elected him President in 1951."

For his outstanding ability which has earned him the respect not only of Port Authority staff members but also of outside representatives of the transportation industry, and for his loyalty, initiative and integrity, the Port of New York Authority is proud to award the Distiguished Service Medal to Nathan Cherniack.

Manhattan Approaches Third Tube Contract Awarded

A contract for $8,177,179.75 for the construction of the first section of the expanded Manhattan approaches to the Lincoln Tunnel in connection with the $100,000,000 Third Tube, was awarded by the Commissioners of The Port of New York Authrity, to the low bidder, Gull Contracting Co., Inc., Flushing, Long Island. Announcement of the award was made by Chairman Howard S. Cullman following the December Board meeting.

At the same time, the Commissioners arranged for the provision of the electric power required for lighting and air compression equipment to be used in the construction of the under-river section of the Third Tube. Purchase of the power will be made from the Public Service Electric and Gas Company of New Jersey at an estimated cost of $120,000.

The contract for the first section of Manhattan approaches provides for the construction of new entrance and exit roadways for the Lincoln Tunnel extending from the south side of Thirty-fourth Street to Thirty-ninth Street between Ninth and Tenth Avenues. The new approach roadways will include underpasses beneath Thirty-fourth, Thirty-fifth, Thirty-sixth, Thirty-seventh and Thirty-eighth Streets and under Dyer Avenue near Thirty-sixth Street.

The contract also includes the construction of a two-lane center ramp from the existing South (New Jersey-bound) Tube under Dyer Avenue to the new roadways. The new ramp will permit the present South Tube to be operated in either direction after the opening of the Third Tube in 1957. The Third Tube will be used for eastbound traffic only.

Other work covered in the contract includes a two-lane, 600-foot underpass which will be constructed under Dyer Avenue, Thirty-ninth Street and Tenth Avenue, providing a direct approach to the North (New York-bound) Tube from the new roadway. The North Tube will continue to be operated westbound after the completion of the new tube.

The present contract is the twenty-sixth awarded to date for Third Tube construction work. It brings to $55,000,000 the amount awarded by the Port Authority since work began on the project in Manhattan on September 25, 1952. A contract for the final section of Manhattan approaches will be awarded next spring. It will provide for the extension of the new entrance and exit roadways south to Thirtieth Street.

When completed in 1957, the new two-lane trans-Hudson tube will increase the annual capacity of the Lincoln Tunnel by 50 per cent and double the peak hour capacity in the direction of preponderant traffic.

Study Shows Freeways Benefits

The high cost of congestion in urban areas is forcibly borne out by a recent survey of the Automobile Club of Southern California of freeways compared to surface streets in the Los Angeles area.

Thirty lives and almost 50 million dollars yearly are being saved by use of the Santa Ana, Hollywood, Arroyo Seco, Harbor, and Ramona Freeways rather

than the surface streets paralleling these limited access, grade separated facilities.

A recent traffic survey shows that 2.03 persons have been killed per 100 million miles of travel on freeways as compared to 4.65 persons killed on surface streets over the same distance. The huge monetary saving is attributed to the following factors as shown below:

	No. of Signalized Intersections	Operating Cost	Average Speeds
Freeways	0	4.021 cents/mile	48.87
Surface Streets	578	8.125 cents/mile	19.54

Using gasoline costs of 30c per gallon, 2 cents per minute for driver and vehicle time, and weighted average daily traffic, Auto Club engineers figured that $50 is saved annually by motorists using the 45 miles of freeways that cost 143 million dollars. If the planned 600-mile system were in some manner built immediately, the following results could be expected:

We could conservatively expect the 600-mile freeway system to carry within a minimum of congestion and with maximum safety a weighted average daily traffic of some 30,000 vehicles. These vehicles would generate about 6.6 billion vehicle miles of the total of 21.6 billion vehicle miles now traveled annually in Los Angeles County, and the saving to drivers using the completed system would exceed $275,000,000 per year. The present 45-mile freeway system now in use is actually saving motorists $50,000,000 annually. Thus, the drivers of Los Angeles County are paying $225,000,000 per year because our freeway system is not complete.

The City of Los Angeles has been compiling data pertaining to the death rate per 100,000,000 vehicle miles of travel on the metropolitan freeways. The following average rates were developed over a 5-year period:

Freeway	Death Rate
Arroyo Seco	2.40
Cahuenga Pass	1.56
Ramona	2.10
Hollywood*	1.16
Santa Ana	2.11
Weighted Average — 2.03	

* Two-year experience.

As a comparison to the accident death rate on freeways, the city selected for study, Figueroa Street from Olympic Boulevard to Imperial Highway and Wilshire Boulevard from Grand Avenue to the city limits of Beverly Hills. It was found that these two arteries best represented average through-traffic streets and that they, in common with the freeways, had at times, a traffic density approaching capacity. A three-year study revealed the accident death rate on the two typical heavy traffic surface streets to average 4.65 per 100,000,000 vehicle miles of travel as opposed to 2.03 on the freeways.

Port Authority police officer at controls of a two-way electric, plastic-enclosed catwalk car, which made its first test run on a 2,200-foot section of miniature railroad track installed on the 2½-foot-wide catwalk of the Holland Tunnel's New York-bound tube at 9:00 P.M., Monday, December 20. The use of the patrol cars in place of foot patrol would permit police officers to cover the tunnel posts faster and with greater convenience, and would result in better supervision of traffic and assistance to motorists.
The 1,300-pound car is two feet wide, eleven feet long and six feet high. It is equipped with a swivel seat and duplicate sets of push buttons which control the speed in either direction at 6 or 12 miles an hour. A 240-volt, three-horsepower electric motor powers the car. The car stops automatically when the speed control button is released, or when it approaches the end of the track.
If operational tests prove successful, four catwalk cars would be installed in each tube of the two-tube Holland and Lincoln Tunnels at a cost of about $700,000. At present six officers are posted along the 1½-mile-long catwalk in each tube of the two trans-Hudson tunnels. The catwalk car would enable four officers to cover the same tunnel posts.
The car was developed by Port Authority Maintenance Research Engineers with the assistance of the Special Devices Division of the Austin Company, 76 Ninth Avenue, New York, which performed basic design and preliminary engineering work.

Applying the accident death rate of 2.03 per 100,000,000 vehicle miles to the 1.2 billion vehicle miles traveled on the 45-mile freeway system we find that we can expect 24 accident deaths yer year on the freeways. If it were necessary for this 1.2 billion vehicle miles to be driven on surface streets having a death rate of 4.65 per 100,000,000 vehicle miles, we could anticipate 56 deaths per year. Thus we can say that the completed freeways now in use in Los Angeles are saving 32 lives per year.

Referring again to our magic wand, and assuming that 10 years ago the 600-mile freeway system had been superimposed upon the street and road network of Los Angeles County, the 6.6 billion vehicle miles transferred from surface streets could be expected to generate traffic deaths at the rate of 2.03 per 100,000,000 vehicle miles or an annual total of about 134. These vehicles, however, were required to drive on surface streets where they generated deaths at the rate of 4.65 per 100,000,000 vehicle miles or 307 deaths per year. Thus, had the freeway system been completed, it is possible that 173 traffic deaths per year could have been averted. In 10 years, the lack of freeways can be charged with a total of approximately 1700 traffic deaths. Truly

WE PAY HEAVILY WITH OUR LIVES AND DOLLARS TO DO WITHOUT ADEQUATE ROADS.

Transportation benefits and savings are not confined to freeway users. Even the small mileage of freeways now in use influences traffic on the surface streets which formerly carried the entire traffic load. As an example, the Hollywood Freeway has reduced the traffic load on Sunset Boulevard, Melrose Avenue, Beverly Boulevard, Temple Street, Third Street, Wilshire Boulevard, Eighth Street and to some extent the load on Olympic Boulevard. As a result, these streets, formerly overcrowded, now operate more or less within their designed

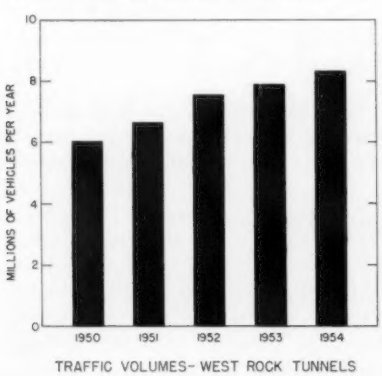
(Continued column 1, page 158)

Parkway Tunnel Facts Reported

Twin tunnels on the Wilbur Cross Parkway at West Rock (near New Haven, Connecticut) have seen 35 million automobiles pass through the 1,200′ tubes during the five years they have been open. No deaths were recorded during this time despite the 50 m.p.h. operating speeds. There have only been 27 accidents in the tunnels or their approaches with 17 cases of personal injury and property damage of $4,570.

The tunnels, perhaps the most unusual part of the Connecticut Highway system were long noted for their quirks and idiosyncracies, although more recently this has not been the case. Special maintenance problems necessitated additional construction contracts after initial completion. The original construction work alone cost the life of one man and several were injured.

The original contract, let in 1947, called for the expenditure of $1,934,000. Costs climbed to $2,770,085, however, before completion due to rock boring difficulties, interior steel work, and other expensive additions. The tunnels were opened on November 1, 1949. It became apparent to Connecticut Highway Department engineers in 1949 and 1950 that the mountain was a veritable "spring." In fact, in March, 1950, during a spring thaw and freeze, heavy formations of ice crashed down the 286-foot ventilation shaft which runs to the top of West Rock. This ice crushed ventilating equipment and forced the closing of the south-bound tube for many days. To prevent recurrence of this, a waterproofing contract of $131,494 was performed in 1951.



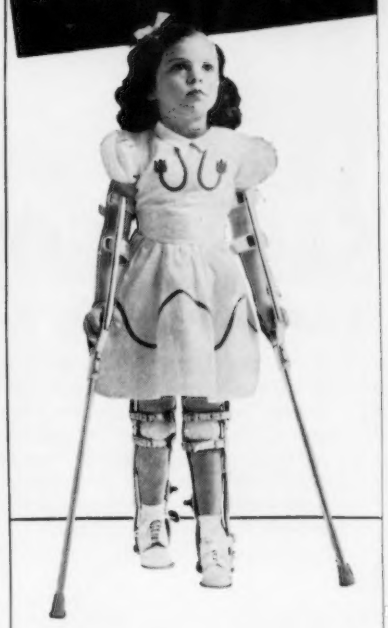
TRAFFIC VOLUMES- WEST ROCK TUNNELS

Work since 1951 has included an interior lighting system at $45,911, painting curbs for increased visibility and annual maintenance costs of $30,000. Only minor floor drain improvements are contemplated in the future. Although the tunnels were criticized at the time of building and shortly thereafter, the usual hindsight has indicated that it was the best thing to do.

When the tunnels were first proposed in the '40's they were only one of several alternatives. One proposed route by-passed New Haven too far to be of traffic service. Another would have veered south and caused vexatious property condemnation in settled New Haven and Hamden, in addition to engineering problems caused by the terrain. A third alternative was that of a "notch" open cut in the present tunnel location. As can be seen from the accompanying photo, this would have necessitated a mountainous highway embankment, longer and higher ramp connections, and tremendous rock cuts, in addition to requiring more valuable right of way.

The tunnels as built, however, seem to have found favor with the driving public also as the annual traffic estimates bear out.

FIGHT POLIO!



NO POLIO VACCINE CAN HELP THIS CHILD. While science works to protect healthy kids against polio, those already stricken are fighting to live and play again.

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NATIONAL COMMITTEE ON URBAN TRANSPORTATION ANNOUNCES PROGRAM

(Continued from page 154)

American Municipal Association. Glenn Richards, Commissioner of Public Works in Detroit, Michigan, who is Chairman of the National Committee, and Norman Kennedy, Committee Staff Director, gave details of the Committee project.

They explained that nine subcommittees have been established and assigned various phases of the undertaking. In the next six months these groups will determine the kind of data that should be collected by cities. The Committee then will draft manuals setting forth the most promising procedures for collecting such information. These procedures will be tested and evaluated through pilot studies in selected cities. Procedures then will be reviewed and refined in the light of the findings from these pilot studies. Final step will be issuance of manuals which will show cities how to carry out data-collecting procedures on a uniform and continuing basis.

These manuals should outline for cities — regardless of their size — the way to get to the heart of their transportation problems.

First Section Palisades Parkway Opened

A two-mile section of the Palisades Interstate Parkway extending from the George Washington Bridge to Palisades Avenue in Englewood Cliffs, New Jersey, was opened to traffic on December 18 by the Palisades Interstate Park Commission. At the same time a direct connection between the George Washington Bridge and the Palisades Parkway was made available to traffic.

The Palisades Interstate Parkway is being constructed by the New Jersey State Highway Department and the New York State Department of Public Works at an estimated cost of $47,000,000. When completed in about two years, the new toll-free passenger car route will extend forty-three miles from Fort Lee, New Jersey, to Bear Mountain, New York. Eight miles of the Parkway are now open in New Jersey from the George Washington Bridge to the Ferry Road Interchange at Alpine where motorists have access to U. S. Route 9-W and the Yonkers Ferry. The remaining three miles of Parkway in New Jersey will be opened in about six months. In New York, thirteen miles are now open and the remaining seventeen and one-half miles are scheduled for completion in about two years.

The direct ramp connections between the bridge and the Parkway were built by the Port Authority at a cost of $2,000,000. An exit ramp from the bridge's westbound lanes allows motorists to drive directly to the entrance of the Parkway. An overpass ramp, crossing the bridge just west of the New Jersey tower, permits Manhattan-bound Parkway traffic to enter the bridge's eastbound lanes. It is estimated that 20 per cent of the bridge's traffic, or about 6,000,000 vehicles annually, will use the new ramps. The new facilities are for passenger car use only since commercial vehicles are not permitted on the parkway.

Running along the Palisades in New Jersey, the Parkway offers a spectacular view of the Hudson River and New York. In Tenafly, New Jersey, the Green Brook section has been retained in its natural setting to serve as a bird sanctuary. In New York, the Parkway crosses the rolling farm land of Rockland County and enters the Ramapo Mountains in the vicinity of Mount Ivy. It continues through the Beechy Bottom Valley and then around the northern side of Bear Mountain to the Bear Mountain Bridge Circle. An extension is proposed from the Circle to the west connecting with the New York State Thruway.

The new Parkway has been constructed as a result of the foresight and generosity of Mr. John D. Rockefeller, Sr. In 1935, he gave to the Commission property valued at over $22,000,000 on which most of the new route is now being built. Mr. Robert Moses, as Chairman of the New York State Council of Parks, has played an important part in obtaining funds for the construction of the New York section of the Parkway.

STUDY SHOWS FREEWAY BENEFITS *(Continued from page 156)*

capacities and traffic engineers are able to time signals to more nearly meet the requirements of progressive movement.

Also, cross traffic, which may never use a freeway, is benefited. For example, the Hollywood Freeway carries a daily average of 101,000 vehicles over or under all north-south streets, thus eliminating millions of intersection conflicts with the attendant reduction of delays and accidents.

Ads to Inform of Highway Needs

Do you know about your state's highway building program?

That is the question which will be raised repeatedly during 1955 by the world's largest manufacturer of highway construction equipment, Caterpillar Tractor Co.

Long interested in better highways, Caterpillar recently conducted a public opinion survey which proved that the average citizen is only partially informed about his state's highway building plans.

Most states have programs for road building and financing, Caterpillar learned in its survey, but officials need the support of the taxpaying citizen before the program can be put into effect.

This is where Caterpillar's State Highway Series of ads will come in. In photos and text, the ads in the nation's leading magazines will spotlight individual states month by month. Each ad will explain what the program means for the citizen in terms of savings of time, money and lives.

The first ad, scheduled for the January 1 issue of *The Saturday Evening Post*, focuses on California. There, every working day, $1,000,000 is being spent on new highways. The ad tells the true-to-life story of Bill Shepherd of Pasadena who daily drives 13 miles to his downtown Los Angeles office in 20 minutes.

Bill once took 35 minutes for the same trip. He is twice as safe on California's freeway as he used to be in the stop-and-go congestion of city streets. He saves 156 hours—19½ work days—a year and, as an average citizen, it cost him only $1.06 per month for better roads.

That is the story of the first ad, which goes on to ask:

"Do you know what your state wants to do for you? You should. It takes only a post card to your state highway commissioner or governor at the state capitol to find out. Then as an informed citizen you can help your state put across its highway program."

The ads will feature other states in succeeding months, according to W. K. Cox, Caterpillar sales promotion manager.

"We think the ads are the answer to a state official's desire to inform the public about his highway building plans —and answer the public's desire to find out what its state program is," Mr. Cox said.

"We admit that we hope this market development type of ad series will help to sell Caterpillar equipment," he continued. "But more importantly—and we are very proud of this—we are in a business where we also help to save lives of the nation's motorists. Bad roads cause accidents as well as consume time and money—they cost more than good roads.

"This campaign for better highways has helped make Caterpillar the nation's No. 1 roadbuilder," said Mr. Cox. "I'm confident our new State Highway Series will develop a new understanding between highway officials and the taxpaying public."

Mr. Cox noted that the series is causing wide comment among state officials, safety organizations, etc.

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Traffic Control, parking, and parking enforcement can become an efficient and economical operation in your city —when you install the dependable KARPARK TWIN-O-MATIC or UNIMATIC parking meters. They're superbly built by the famous HERSCHEDE HALL CLOCK COMPANY, makers of America's finest clocks.

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Times two cars with one installation. Adjusts to any desired change in regulations. Reduces maintenance and collection costs to unheard-of lows. Ruggedly built for long life.

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For single car parking. Can be used for an entire system of single car parking, or, when used with Twin-O-Matic, can be placed at street ends and special single locations.

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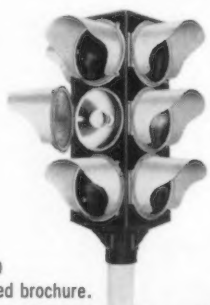

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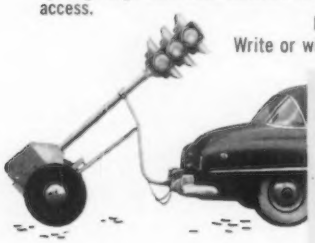

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PAR Drive Gets Underway in Florida

The PAR Committee of the Florida Highway Users Conference, at a meeting in Orlando December 2, launched a drive for a two-point program aimed at attaining "sound, reasonable, efficient and progressive" highway development "within the framework of existing tax rates."

The program — which has been endorsed by 225 organizations representing agriculture and virtually every industry in Florida—is as follows:

1. Allocate to the State Road Fund for urgently needed road improvement the unpledged surplus of motor vehicle license tag revenue now going to the General Fund.

2. Reorganize the State Road Department for more efficiency and stagger the terms of State Road Board members to enable a continuing improvement program.

In his address to the meeting, Arthur C. Butler, Director of the National Highway Users Conference and Secretary of the National PAR Committee, pointed out that Florida's twenty-year highway program might be completed in twelve years or less if the unpledged surplus of motor vehicle license tag revenues now going to the General Fund is allocated to the State Road Fund.

Commenting on last year's $19 million unpledged surplus that went into Florida's General Fund, Mr. Butler declared:

"If this amount were added to your State Road Fund, it could advance the completion of your project not just one or two years, not just five years, but at least as much as eight years. This means that your twenty-year program would almost automatically become, at the longest, a twelve-year program."

Mr. Butler reminded the group that Florida has all the usual reasons for needing adequate roads "plus the fact that this state's economy is particularly closely tied to agriculture and tourists. And, outside of the transportation business itself, no two businesses are more dependent on roads."

The use of sufficiency ratings in developing the Florida highway program also was hailed by Mr. Butler as an excellent example of "doing first things first." He added that he was certain that the Florida PAR Committee's victory is "as inevitable as your cause is good."

State Senator George Tapper also spoke at the meeting and explained the seventeen recommendations of the Florida Legislative Council's select committee on roads. These include general reorganization of Florida's State Road Department and use of registration fee revenue for right-of-way acquisition.

Sidney O. Chase, Jr., Chairman of the Florida PAR Committee, presided at the meeting, while Glen P. Woodard, Jr., of the Florida Petroleum Industries Committee, introduced Mr. Butler.

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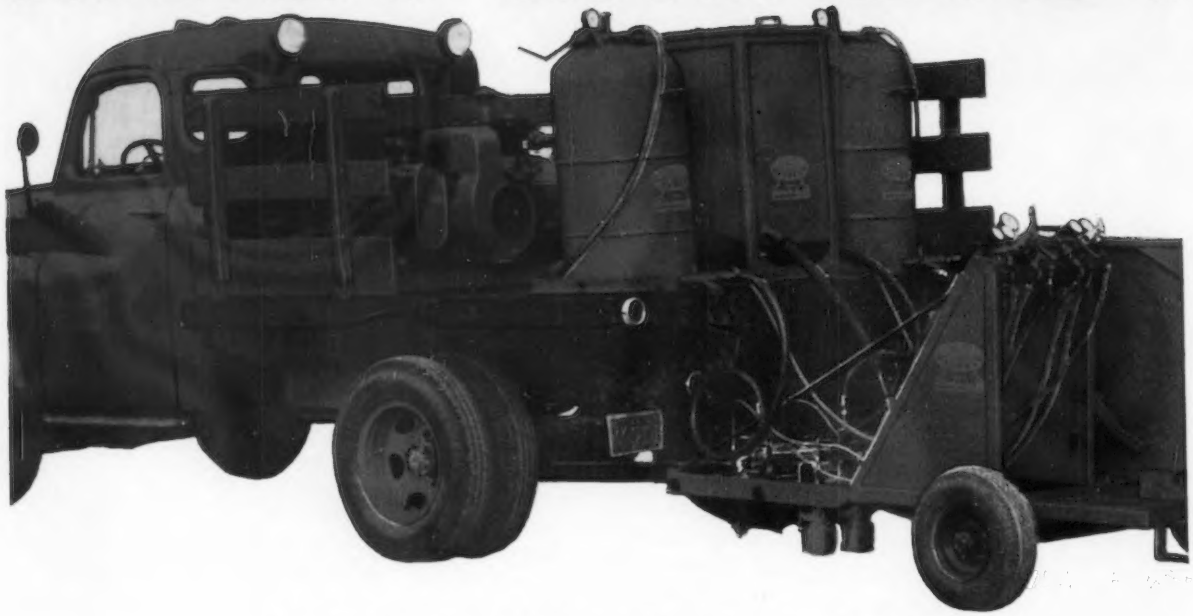


WALD TRUCK-O-LINER

Model 345

Here's the striping unit that lays down a lot of line in a little time. Built for big production jobs, it will stripe miles of highway with speed, efficiency and economy—and does it in single or multiple lines and colors, with reflective or non-reflective marking materials.

WALD
Reflectoliner Jr.

Lightweight, but packs a wallop! This durable striper has a petty cash price tag but does a great job with either plain or reflective materials!

WALD
Model 12

Rugged, Reliable and Ready . . . for every single line striping job. Self propelled, with 100% air reserve.

BIG SAVINGS

3-man team technique, plus the multiple line feature eliminate separate operations—save time and money. Higher speed, fewer stops, greater efficiency give you lowest cost-per-mile striping of any liner on the market. When not on striping operations truck unit can be used for other purposes.

BIG PRODUCTION

Model 345 *really* turns out the work! Designed especially to meet the need for a high speed, production-line striping unit, the Truck-O-Liner's big capacity keeps you in continuous operation for long periods without reloading.

Write or phone today for catalog W-10

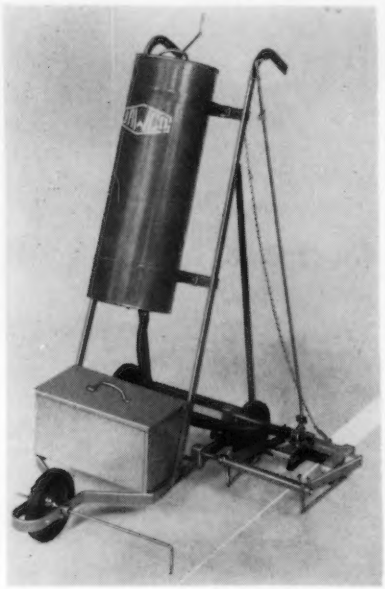
WALD INDUSTRIES, INC.
HUNTINGDON, PENNA.

1176

Strictly Business

New, All-Purpose Traffic Liner Handles A Variety Of Jobs

With the new, all-purpose JAWCO Model 500 Traffic Liner, manufactured by the Weaver Machine Co., York, Pennsylvania, you get three liners in one. Place the famous and popular JAWCO applicator brush on the left side of the Model 500 (as illustrated) and you can mark diagonal parking lines right out



from the curb. In a matter of minutes you can quickly transfer the applicator brush to the right side of the machine, and you are ready to lay down clean, straight lines for ordinary traffic or industrial lines.

The JAWCO Model 500 Liner also offers an attachment for marking all athletic fields, clay tennis courts, etc., with whitewash lines. A hand operated agitator in the lid of the tank eliminates settling and provides a smooth, even flow.

A five-gallon tank is placed up between the handles of the JAWCO model 500 Liner to increase the flow of paint or whitewash, and an adjustable stop is placed on the flow-control lever to allow just the right amount of liquid to flow into the applicator brush. You can get a JAWCO Model 500 for lining with both paint and whitewash, with paint only, or with whitewash only.

Ruggedly made of heavy-duty steel, the JAWCO Model 500 Liner weighs 45 pounds. It is 43½ inches high, 27 inches wide and 33 inches long. A 6" x 6" x 12½" accessory box is placed behind the front wheel, between the handles, and can be used to store brushes, solvent, chalk lines, etc.

The Weaver Machine Co., P. O. Box 1224, York, Pennsylvania, will send you complete information on their JAWCO Model 500 all-purpose liner.

Ready-Mixed Aluminum Paint Spec. Available

A revised publication, *A Suggested Specification for Ready-Mixed Aluminum Paint for Highway Bridges,* has recently been published by Aluminum Company of America. The specification presented in the booklet describes one type of ready-mixed aluminum paint suitable for painting steel bridges and other outdoor steel structures. The publication also sets forth methods for testing the aluminum paint's composition, weight per gallon, drying time, viscosity and moisture content.

Ready-mixed aluminum paint meeting the specification suggested in the booklet, should give as excellent results as paint mixed by hand on the job. By using these specifications, highway engineers can effect a desirable saving by decreasing the amount of time spent mixing aluminum paint, as well as by reducing material losses to a minimum. Also, there is less danger of the paint being contaminated; and the product will be more consistently uniform in composition, an important consideration for good durability.

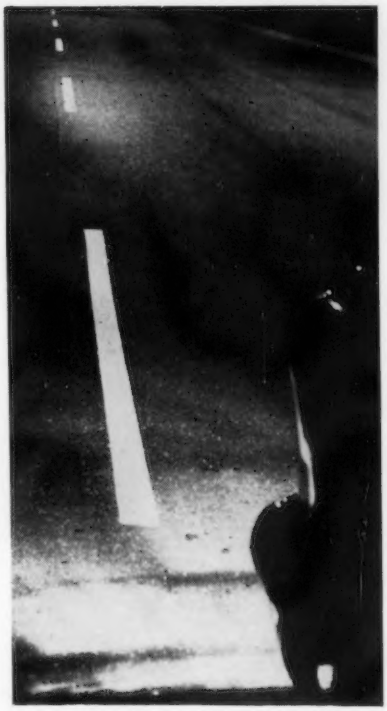
The suggested specification, making use of Federal Specifications and ASTM methods of testing, was prepared at Alcoa's Aluminum Research Laboratories, at the request of officials from a number of state highway departments. The thorough, up-to-date discussion of pigment and vehicle — both used successfully for many years for painting weather-exposed steel—should be of great aid to the increasing number of engineers specifying and using this durable, protective paint product.

The specification may be obtained by writing 747 Alcoa Building, Pittsburgh 19, Pennsylvania.

Continuous Thermoplastic Lines Now Available

A recent innovation in the field of safety markings is the development and introduction of continuous plastic lines by Crystalex, Inc., Berlin, New Jersey, for highways, airports, parking areas, etc.

Crystalex is applied in a molten state at a high temperature, forming a permanent bond with the roadway surface. The material may be applied in any desired length, width, thickness, shape, etc., and is impregnated with optical glass beads for effective night visibility throughout all stages of wear.



Crystalex is quickly and simply applied by gravity feed from a heated container and solidifies instantly, so that traffic may be permitted on it within three minutes or less. Costly barricading, congestion, and traffic hazards are virtually eliminated.

Because of its physical and chemical composition, Crystalex withstands weathering and traffic wear for amazingly long periods, again obviating the necessity for frequent maintenance and consequent traffic tie-ups.

For more complete information, contact Crystalex, Inc., Berlin, New Jersey.

a parking meter does its job with a signal
EXPIRED
all red (OVER PARKING)
no red (LEGAL)
LIMIT 10 HOURS
NEVER PART RED DURING LEGAL PARKING. LARGE SIGNAL AREA SEEN FROM BOTH SIDES.
FOR ECONOMICAL ENFORCEMENT THE SIGNAL MUST BE SEEN
50 yards away
FROM MOVING PATROL VEHICLE

MODEL H PARK-O-METERS

MEET EVERY REQUIREMENT IN ANY CITY

PARK-O-METER is adjustable to take any one or more of commonly used coins: pennies, nickels, dimes or quarters, through the same coin-slot to allow 6 minutes to 24 hours parking time in any coin and time combination.

This complete convertibility assures adaptability to changing traffic requirements and to either on-street or off-street operation.

The simplicity of PARK-O-METER's one-hand, automatic operation appeals to the public and builds quick acceptance and approval.

Ask for a demonstration . . . there is no obligation on your part. You owe it to yourself to know all about PARK-O-METER.

Magee-Hale PARK-O-METER COMPANY
COMMERCE EXCHANGE BUILDING • OKLAHOMA CITY 2, OKLAHOMA

Tailgate Loader Used For Signal Truck

The Ven Corporation, 2832 Newell Street, Los Angeles, Calif., has announced an entirely new application for their famous Venco Tailgate Loader. The Loader, originally designed to lift objects from street level to truck bed level has now been inverted and mounted on a small truck and used to elevate a person to comfortable working posi-

tion for traffic signal, street light or street sign repairs or maintenance. The platform, which is adjustable in height can be lowered and folded when truck is in motion. When platform is folded it allows the aerial ladder to swing a full 360°.

This adaptation of a proven piece of equipment should prove highly useful and economical for all city, county and state departments that are charged with the installation, repair and maintenance of traffic controls, street signs and lights. As a matter of fact, the Los Angeles City Department of Traffic, in conjunction with whom this new application was developed, has ordered eight units. Such an installation is shown here in action and dramatically demonstrates its efficient use.

According to Mr. William Vogel, President of the Ven Corporation, two weeks' delivery time can be promised. Drawings can be furnished on request, showing all dimensions of the unit. The Venco platform unit is $250.00 FOB Los Angeles. Further details can be obtained by writing to Ven Corporation, 2832 Newell Street, Los Angeles 39, California.

Atlanta Buys "Veon" Traffic Lines

Contracts were let on December 10th by the City of Atlanta, Georgia, to the J. W. Goldsmith Company of that city, to lay approximately 28,000 feet of four-inch "Veon" crosswalk traffic lines at school and downtown crossings.

This is the first contract of any size to be let in the Southeast for the application of the new plastic-base street marking compound. The contract followed a successful demonstration of the product developed by Veon Chemical Company of Long Island City, N. Y., who last winter laid test markings on North Side Drive in Atlanta.

Appointment of J. W. Goldsmith Company was announced in November. This contractor will handle the "Veon" products and make applications in Georgia, Alabama, South Carolina, Florida and part of Tennessee. Veon Chemical Company leased the special equipment necessary to lay "Veon" lines, to the Atlanta firm. Appointment of distributors in New Orleans, Dallas, Houston and Los Angeles, will be completed during January, according to Jason D. Radding, sales manager for Veon Chemical.

Trucking Company Installs 2-Way Radio

One of the nation's largest motor transport lines in December initiated a long-range modernization program which will equip its trucks and key freight terminals with RCA two-way mobile radio equipment, it was announced jointly by the Watson Brothers Transport Company, Inc., Omaha, Nebraska, and the Radio Corporation of America.

The Watson Company is radio-equipping its facilities in a move to speed and improve customer service and reduce operating costs, according to William Wolfe, Executive Vice-President of the transport firm.

Initial radio installations, scheduled for completion early in January, will provide a base station at the Watson Chicago freight terminal and RCA Fleetfone two-way mobile radio units in 38 transport trucks, C. M. Lewis, Manager, RCA Communications Equipment Marketing, announced.

Other key Watson terminals are located in Denver, Kansas City, Los Angeles, Minneapolis, Omaha, and St. Louis.

INTERSTATE RUBBER
presents the
TRAFFICONE SYSTEM
of TRAFFIC CONTROL

WHY TRAFFICONE SYSTEM IS PREFERRED BY SAFETY MINDED TRAFFIC ENGINEERS

- 36-page Traffic Manual goes into every phase of traffic problems.
- Tested and approved through years of experience in the laboratory and in the field.
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- Saves money by eliminating the rebuilding of old fashioned wood and wire markers.

FACTS ABOUT TRAFFICONES

- Two sizes
  28" — Barricade
  18" — Channel
- Colors
  Red, yellow, black.
- Lightweight and portable.
- Lane channeling set up in one-tenth the time required with wooden and wire markers.
- Require minimum storage space.
- They stack.
- Will not break or become distorted.
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- Reflectorized for night operation.
- Flexible rubber.

Guide the Motorist . . .
don't confuse him

Please write for complete information on how to increase the effectiveness of your traffic controls. 36-page manual and colorful literature available.

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Los Angeles, California

New Appointments . . .

Hammond New Executive VP of TAA

Harold F. Hammond (Mem., ITE) of Washington, D. C., will become Executive Vice-President of the Transportation Association of America effective January 15, succeeding the late Donald D. Conn. Dr. George P. Baker, President of the Association, announced the selection with the approval of the Board of Directors.

Harold F. Hammond

Mr. Hammond has for seven years been manager of the Transportation and Communication Department, Chamber of Commerce of the United States, as well as secretary of the Chamber's 45-man Transportation and Communication Committee.

He will maintain executive offices in Washington with Leif Gilstad, the First Vice-President, as well as in Chicago, where the Association's general offices are located. Mr. Hammond will be responsible for management, pubic relations, organization, membership, and Washington activities.

"The Association is very fortunate in inducing Mr. Hammond to join us," Dr. Baker said. "He is not only widely experienced in transportation problems of all kinds, but is highly regarded by shipper groups and all segments of the transport industry. His experience in the Chamber of Commerce will be particularly valuable. His background in dealing with diverse interests and in field organization for public education will be extremely useful."

A native of Nebraska, Mr. Hammond spent his early years in Iowa, is a graduate of the University of Michigan, and has a master of science degree in civil engineering from Harvard University. He has been a traffic and transportation consultant; was director of the traffic and transportation division of the National Conservation Bureau; then Washington manager of the American Transit Association before joining the U. S. Chamber of Commerce in 1947.

During the war he served as transportation consultant to the Office of Defense Transportation and the Naval Operating Base at Norfolk. He is a member of various national traffic and transportation organizations, past president of ITE, and has written a number of publications on transport subjects.

General Manager Appointed by Safety Council

The National Safety Council recently announced the appointment of Major General George Craig Stewart as general manager, a new post created to broaden top-level administration of the Council.

General Stewart

The need for expanded activity in highway safety is in part responsible for the creation of the new general managership, according to Ned H. Dearborn, president of the National Safety Council. Selection of General Stewart was made after months of screening by a special Council committee of business and safety leaders.

Born in Selma, Alabama, in 1902, General Stewart graduated from the U. S. Military Academy in 1923 and advanced through the grades to his present rank of major general. In 1942 he was assigned to the Transportation Corps and rapidly gained a reputation as a transportation expert.

General Stewart's outstanding abilities in this specialized field were first demonstrated at the Oran landing in North Africa. He successively became transportation chief for the North African Theater of Operations, chief of the southern lines of communication for the invasion of southern France, deputy chief for the European Theater of Operations, and chief for Army Forces in the Western Pacific.

In 1946 he became commanding general of Fort Eustis, Va., and commandant of the Transportation School. The Korean War found him assistant division commander of the Tenth Infantry Division. He served in Korea as commander of the Inchon base for the 1950 invasion landing, and as assistant division commander of the Second Infantry Division.

He returned to the United States in 1951 and served on the General Staff of the Department of the Army. In 1953, he was named director of the Office of Military Assistance, Office of the Secretary of Defense, a post which he held until his retirement on October 31, 1954.

General Stewart has twice been awarded the Distinguished Service Medal, and the Silver Star Medal. In addition, he has received the Legion of Merit, the Bronze Star Medal, and several decorations from other countries.

LOOKING AHEAD

FEBRUARY 2-3-4 — BERKELEY, CALIFORNIA
Seventh California Street and Highway Conference, Institute of Transportation and Traffic Engineering, University of California.

FEBRUARY 18-19—CHARLOTTE, NORTH CAROLINA
Annual Spring meeting National Society of Professional Engineers, Hotel Charlotte.

FEBRUARY 27 - MARCH 1 — NEW ORLEANS, LOUISIANA
Annual Southern Safety Conference and Exposition, Jung Hotel. (Executive Director, W. L. Groth, P. O. Box 8927, Richmond, Virginia.)

SECTION NEWS

Midwest Section

From November Midwest ITEms

Manufacturers' Night

Manufacturers' Night proved again that traffic engineers have other talents. This time it was in the field of terpsichory. Bob Harris' Rockette-type high kicking, Pete Page's Hula, Mary Blachman's Waltz, and Al Plantin's Boops-a-Daisy were highlights of the evening. To Sylvia Kent, a gal from Detroit, goes credit for discovering these wonders.

All of this happened during the entertainment portion of the program. President Gross announced nominations for 1955 officers and other bits of business followed the dinner. Best of all was the return of our roster which was alleged to have fallen into hands of ????

Entertainment got off to a shaky start because of inadequate facilities — no dressing room, no mike, no spotlight. Matt Sielski's boys rose to the occasion but did not quite lack all the technical problems. None of this detracted from Larry Kane's suave MCing.

ITE-NSC Luncheon

Thirty-three Section members and fourteen ITE's and friends from places beyond Section boundaries broke bread at the annual luncheon meeting on October 19 during the week of the National Safety Congress. Apart from introductions of dignitaries and guests there was nothing to interfere with bull sessions. Evidence of cordiality that existed was the rush at the refreshment bar.

Out-of-town visitors attending the Safety Congress who found time to come to the luncheon were: Bob Mitchell, Wilmington; Jim Darrell, St. Paul; Ted Holmes and Bob Eliot III, Washington; Art Reilly, Boston; George Howie, Cincinnati; Ralph Sprungman, Minneapolis; Jerry Franklin, Grand Rapids; Roger Chandler, Providence; Mike Gittens and Joe Gudenburg, Pittsburg; Harold Hickman, Flint; Doug Bowers, Oklahoma City; and Walter O. Ladd, St. Joseph, Missouri.

Chicago Adds - Subtracts

Similar to a mathematical equation, The Bureau of Street Traffic has had additions and subtractions among its personnel during the last few months. A new look has come about, due to the following changes:

Winnipeg Tribune

Plus — James Madison Hunnicutt

Jim returned to the fold of the BST after conquering the course of graduate study at Yale Bureau of Highway Traffic. Now leading the Field Division, his tales of the old South once again echo through the corridors of City Hall.

Minus — Michael A. Powills

Deciding to venture into private enterprise, Mike accepted a position with Associated Consultants last month. An 80-mile daily commuting problem is only one of his new challenges, but Mike likes challenges and intends to conquer all.

Plus — Robert L. Zralek

Bob joined the BST after receiving his master's degree at the University of Illinois. Formerly the CTA, Bob has been assigned duties with the Engineering division. A go-getter all the way, he is waging his own personal war on unauthorized signs, signal outages, and abandoned vehicles.

Minus — Dale Humphrey

Hearing the call of higher learning, Dale has ventured to New Haven and the Yale Bureau of Highway Traffic. Only time will tell whether, upon his return, he will come back to the BST or join one of the fine rest homes in Chicago and vicinity.

Plus — Michael J. Hartigan

Mike, having attended the Yale Bureau this last year also, left the Bureau of Engineering this summer to join the BST. He, too, has been placed in the BST Engineering Division and can be found any day in Room 709, engineering traffic as traffic should be engineered.

Sorenson Completes 40 Years

Surprised!!—and how—was Leslie J. Sorenson, and, proud, his wife Gladys, at the 25th Annual Banquet of the ITE in Kansas City in September, when the new president Harry Porter, read a long telegram from the Mid-west Section congratulating Les on completion of 40 years service with the City of Chicago.

The next day an avalanche of telegrams from distant places throughout the country caused Les to telephone a local bank and request a delivery of quarters with which to pay off bell-hops delivering the constant stream of messages.

It will surprise many members of ITE, and especially the younger set, to know that Les has the distinction of being the first person to bear the title of City Traffic Engineer in this land. And that, of course, means in any land!

Les conducted the first traffic cordon count in any city. He was part of, and participated in, the development of Chicago's Loop and Michigan Avenue traffic signal systems, and a dozen or more of the early progressive signal systems throughout the city. He headed the Chicago delegation to the first National Conference on Street and Highway Safety, held in Washington, D. C., in 1928. The Conference produced a model municipal traffic ordinance, drivers' license act, financial responsibility act, and a state motor vehicle law.

Les was a member of the Committee which drew up the plans and operation of the first version of the Cafeteria Traffic Court for Chicago. Very few know that he was Vice-President of the National Safety Council's division on

traffic from 1943 to 1949 and on its Board of Directors from 1938 to date.

Traffic engineers generally are aware of Mr. Sorenson's prominence in our chosen field, but few know of his accomplishment as a saxophonist. Before Petrillo controlled the music world completely, Les was a member of the White Wing Band of Chicago's Bureau of Streets and, incidentally, its manager at one time. Concerts were presented throughout the city—and for free, too.

Les graced the campus of the University of Wisconsin, and we presume his fondest hope in those days was to be a utility magnate. He did start his working career with a Wisconsin telephone company. But, alas and alack, that industry lost a good man while the Traffic Engineering profession gained considerably in stature.

By the way, there was an old sage who quipped that "The first 100 years are the hardest." After threatening that character, we successfully got the term reduced to 99. So there you are, Les, don't let the old man down.

Convention Rear View

The '54 Convention is now part of ITE history. The Midwest ITEs who attended will certainly have many fond memories of it. Those who didn't may get an idea of what they missed from a brief description of the happenings.

Planes, trains and automobiles delivered ITE members to Kansas City for the opening of the convention on September 27. The site was the Hotel Muehlebach, where we found the Western ITEs firmly entrenched in Harry Truman's presidential suite, actively campaigning for San Francisco in '56 (they won, too). The headquarters room did a fine business from the start, and Joe Prismo entertained there with a model railroad game where ITEs madly threw switches and averted (or more often, caused) wrecks.

Technical sessions (split for rural and urban) and luncheons occurred with clocklike regularity. The Biscuit Banter Breakfast developed into a hilarious blind auction, with everything sold from toilet paper to wrist watches. The K. C. ITEs later took us on a complete tour of their proud city, winding up with a chuck wagon dinner at their famed Saddle and Sirloin Club.

Whoever sneaked the photo of Pres. Porter and Ellen into the hands of NSC brass earns nothing but scorn. It seems Harry's bright lights were on when snapped in K. C.

We were happy to see that Peoria sent its *entire* traffic engineering staff to the convention, and it was nice to have DAN HANSON around.

At the Biscuit Banter, it was difficult to understand why ZEKE FAULKNER made his coffee foam over after EVAN OLMSTEAD had done the same thing with the same "sugar" only minutes before.

DICK KANAK got some nice movies of Kansas City including a good shot of DICK FENCL'S arm closing the bus window on a scene.

RALPH GROSS claimed the judges were prejudiced in the model railroad game, but nevertheless accepted the booby prize cup with a magnificent and much cheered speech.

TED SIEGEL'S and JIM HUNNICUTT'S picture made the Kansas City paper as typical (ugh!) ITE conventioneers.

We're just wondering what would have happened if MATT SIELSKI'S convention campaign for "Cicero in '56" had succeeded.

The RALPH MICHEL's finally capitalized on a chance to enjoy a convention rather than run one.

Letter to President

Mr. Ralph Gross, President
Mid-West Section ITE

Dear Mr. Gross:

Please accept my apologies for the long delay in returning the attached roster to you. As you know, it was used in the late Senate investigation—Book 672—Volume 47, Pages 16-736, Exhibit #999. You may rest assured that I have not revealed the source of my information.

The names and conditions you mentioned have been investigated. They are all above board with the following exceptions:

(1) You intimate that these men (listed on the ITE Roster) are continually changing lights from green to amber, and then finally to red—subtly signalling to subversive elements that the time has come to *strike*. We find this to be untrue. The light is red no longer than it is green and—in following your line of thought, that would mean they were calling on the Irish. The Irish could *never* be a subversive element. They could never be quiet for that long. Ask your Bob Kelly.

(2) Following this, you suggested that the red signal no longer be red—but "heliotrope." We have given this a great deal of thought and have come to the conclusion that this would only lead to the downfall of back-seat drivers. By the time this helpful person could say "Stop — Heliotrope light," there would be a pile-up of cars that Les Sorenson or Harry Porter could not untangle.

(3) You also point out that while the "Stop" sign was formerly yellow, it is now red. Our investigations show that this sign originated in Russia, infiltrated through Siberia and Lower Slobovia, and finally was smuggled into Lower California by Agent Joe Havenner. Through his affiliation with the ITE he has managed to place it in use in many of the cities of this country. His co-agents in Chicago are Dick Fencl, Les Sorenson, Bill Marston and Lyle Ehrenberg, who seems to have an ulterior motive — MONEY. *Watch these men.* They may be only dupes (dopes), but that type of person is dangerous to the safety and welfare of our country.

(4) Your insinuation that the Chicago Motor Club is a communistic organization is entirely without foundation. Nothing could be further from the truth. The emblem which you say is a red star surrounded by a sickle is in reality a red star surrounded by a "C" which stands for Chicago, a dirty, filthy place, a hide-out for the "denouncing" democratic party. Matt Sielski has already filed suit against Russia accusing them of stealing emblems and name endings. Vishinsky has denied everything.

(5) You also point out that at the Annual Meeting in Kansas City, quite a few of those present drank Manhattans, and that those leaving the "red" cherry in their glasses later congregated in a secret meeting room to discuss invasion plans. We have discovered from E. Olmstead, Ted Siegel and Charles Michalski that you couldn't be more wrong. That was the "Men's Room," and it wasn't invasion they were discussing.

(6) We have also investigated the committee who is planning to place "Yield" signs throughout the country. We agree with you that this can only lead to the weakening of our national defense, and this MUST NOT BE DONE. I'm relying on you to forestall such a plan. My suggestion is that you ship these signs to Russia and see if they'll yield anything.

(7) Your report that John Zimmerman, Walter Jolesch and Peter Page started an underground movement and held a secret meeting for 3 days is not entirely incorrect. They went underground alright—in the new Grant Park Garage and lost their way.

Here's the traffic control system everybody's talking about*...

CROUSE-HINDS Trafflex CONTROL SYSTEM

for full flexible-progressive control of traffic

Partial list of Super-Trafflex equipped cities

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Hartford, Connecticut
Washington, D. C.
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Baton Rouge, Louisiana
Lewiston, Maine
Baltimore, Maryland
Brockton, Mass.
Battle Creek, Michigan
Vicksburg, Mississippi
St. Joseph, Missouri
Albuquerque, New Mexico
Batavia, New York
Rochester, New York
Goldsboro, North Carolina
Toledo, Ohio
Tulsa, Oklahoma
Klamath Falls, Oregon
McKeesport, Pennsylvania
Bristol, Tennessee
Austin, Texas
Dallas, Texas
Laredo, Texas
Longview, Texas
Norfolk, Virginia
Bellingham, Washington
Green Bay, Wisconsin
Cheyenne, Wyoming
Melbourne, Australia
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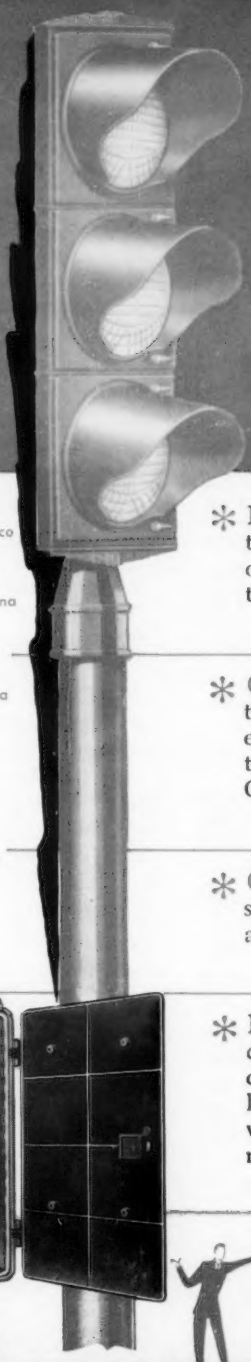

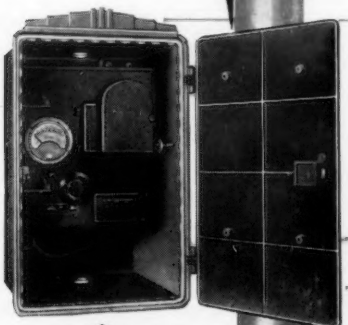

* Buffalo, N. Y. ". . . many times we were more than pleased that we chose a system so reliable – one that could be adjusted on the spot with the only tools required being a key to open the cabinet."

SUPERINTENDENT, BUFFALO POLICE SIGNAL SYSTEM

* Charlotte, N. Carolina. "The design of your traffic controller makes combinations of settings for traffic patterns very easy. The equipment will handle all types of traffic volumes by time of day or day of week that the street pattern here in Charlotte is required to carry."

TRAFFIC ENGINEER

* Columbia, S. Carolina. "After ten years, we are thoroughly satisfied with this system because of its reasonable cost, dependability, flexibility and ease of maintenance."

CITY ELECTRICIAN

* Lubbock, Texas. "We are using Crouse-Hinds three-dial controllers to advantage. At one critical intersection, the traffic count was 2107 vehicles during the peak hour. The new installation was made approximately one year ago, and today, 4152 vehicles are moved through this intersection during the afternoon peak hour period."

TRAFFIC ENGINEER

The Super-Trafflex Master Controller acts upon signal secondaries at each intersection – slows them down or speeds them up as required – keeps them in a proper time relationship with respect to each other – completely supervises their operation at all times to provide a smooth, uninterrupted flow of traffic in all directions at varying speeds.

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GUARD RAIL
cushions shock . . .
deflects cars safely

TUTHILL deep beam construction transmits impact to guard post, deflects and protects vehicle and occupants. Convex rail, secured to post with a single bolt, meets "deep beam" specifications . . . costs less to install, cuts maintenance. TUTHILL'S convex curve also gives highest visibility in darkness, rain or fog.

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WRITE TODAY for complete brochure

(8) The report that Russ Newell and Ralph Michel are following the lead of UN Delegate Vishinsky and turning down everything with their veto powers is not true. The only reason they say "No" is to show the authority they cannot use at home.

I believe this covers all the suggestions you made. Keep your ear to the ground and if you hear anything even slightly pink, please let me know. You can reach me through the "Must Joe Go" organization.

Once again, thanks for your assistance. Without it, I would never have been censured.

Sincerely yours,

JOE

New York Metropolitan Section

The second (dinner) meeting of the New York Metropolitan Section of the Institute of Traffic Engineers was called to order at 8:00 P.M. on October 21, 1954, at the New York Times Restaurant. Thirty-four members and guests were present.

After the self introductions, the Minutes of the previous meeting (September 9, 1954) were read and approved.

Mr. Leonard, Chairman of the Membership Committee, stated that his committee has the dual responsibility to contact Section members who have not regularly attended meetings in an effort to increase meeting attendance and to contact prospective members. Each member of the committee has been given a list of people and organizations to contact.

The progress report of the Newsletter Committee, presented by Mr. Corgill, was accepted. The committee was instructed to continue their investigations and submit a report estimating the cost of publication of the newsletter and making any other recommendations, including a title, they deem necessary The committee was authorized a budget of $15 for this work.

Mr. Wetzel was then asked to outline the actions of the Board of Directors taken at the Kansas City meeting. He reported that the Section's letter of intent to invite the Institute to hold the annual meeting in New York in 1956 or 1957 had been submitted to the Board. He noted that the Board had adopted a policy of rotating the meeting location among the Districts with no District to have the meeting twice within a six-year period. Under this rotation policy, District I which had the 1953 meeting, would have the meeting again in 1959. The Chairman of the Technical Session will solicit each Section for suggestions for speakers in order to draft a program which can be presented to the Board for the annual January meeting. It is recommended that four technical sessions be held with a field trip optional. Budgets for each annual meeting will be limited to $10,000. The Board also discussed the possibility of changing the annual meeting date and Mr. Wetzel asked that the Section express its feelings on this matter.

Messrs. Cherniack, Olcott and Bender then gave their impressions of the Technical Sessions.

On a motion made by Mr. Cherniack, the following resolution was adopted:

"Whereas it is the sense of members of the New York Metropolitan Section that Edward G. Wetzel has represented this Section effectively and faithfully as Director, now

BE IT RESOLVED that the New York Metropolitan Section is pleased to recommend to the Nominating Committee that he be nominated to represent District I for another term of two years."

At the suggestion of Mr. Bender, it was agreed that an effort would be made to adjourn noon meetings of the Section by 2:00 P.M. and evening meetings by 9:30 P.M.

Reported by Warren S. Quimby
Secretary-Treasurer

Southern Section

Clipped from the October Newsletter

Carolina Events

The City of Charlotte is contemplating the installation of a volume density master controller to be inter-connected with the present flexible progressive system now in operation in the central business district in Charlotte. This will be installed sometime during October or November.

Construction has been underway in the last three months on a 2.2 miles of semi-expressway, which includes one interchange at an intersection which is carrying at the present time approximately 45,000 vehicles in 24 hours. This section of road will be completed in approximately 14 months.

H. J. Hoose, Traffic Engineer, City of Charlotte, has been asked to serve on a sub-committee of the National Committee on Urban Transportation, also Karl A. Bevins (Mem., ITE) of Atlanta, John T. Hanna (Assoc., ITE) of Richmond and Paul L. Ristroph (Mem.,

ITE) of New Orleans are members of the sub-committees.

Florida

The new bridge across Tampa Bay, between the south end of St. Petersburg and the mainland, was recently opened to traffic. It greatly reduces the travel distance and time by auto between St. Petersburg and points south of that city.

The off-street parking survey of the City of Miami including not only the parking problems of the central business district, but with all critical areas within the city, is nearing completion.

Georgia

Congratulations are in order for Marble J. Hensley (Assoc., ITE), Asst. Traffic Engineer for the City of Atlanta, who has accepted the position of Traffic Engineer with the City of Chattanooga, Tennessee, effective Sept. 16th. Mr. Hensley is organizing and heading a brand new Traffic Engineering Department in the City of Chattanooga, and will report directly to the Mayor of the city.

Kentucky

A new program is underway—the installing of underground mastarm type traffic signals and "Wait-Walk" lights at about 50 intersections in downtown Louisville. The "Wait-Walk" lights are not designed to create separate pedestrian intervals, but rather will operate so as to avoid conflict between pedestrians and turning vehicles and further, to clear the street of pedestrians prior to the change in the traffic signal.

This program will cost approximately $125,000.

Virginia

The Richmond firm of Traffic Engineer's Supply Corporation has been actively engaged in traffic engineering survey, design, sale and installation of traffic control devices in the three state areas of West Virginia, Virginia and North Carolina for approximately the past fourteen months.

Surveys have just been completed in the City of Clarksburg, Charleston, South Charleston and Huntington, West Virginia. These surveys were conducted by this firm at no cost or obligation to the municipality as an integral part of our sale policy in accordance with our distributor's franchise with General Electric.

Thus far the firm has been instrumental in getting the post of traffic engineer and the traffic engineering division created in two cities where surveys have been conducted and recommendations for the creation of separate traffic engineering divisions are likely to be approved in three more cities who have full time traffic engineers already.

John T. Hanna (Assoc., ITE) has been appointed Acting Assistant Director of Public Safety for the City of Richmond. Mr. Hanna has been relieved of his post as City Traffic Engineer and is being given serious consideration for the post of Assistant Director. Mr. H. R. Perkins (Assoc., ITE) is Acting City Traffic Engineer during the temporary appointments. Good luck to both boys!!

Virginia is about to embark upon the largest highway project ever undertaken in this state. On October 8th bids will be received from the shore to shore portion of the Hampton Roads Tunnel project which begins at Route 17 in the City of Warwick, passes through the City of Hampton, crosses Hampton Roads from a point approximately 1000′ from Fort Monroe, passes near Fort Wool, and connects with Ocean View Avenue on Willoughby Spit. It then leaves Ocean View Avenue approximately 3000′ west of Granby Street and moves southeastwardly under Granby Street where it ends at Sewell's Point Road.

The over-all length is 23 miles, and it will be built at an estimated cost of 63 million dollars. The tunnel is 7479′ in length with a roadway width of 23′ and a vertical clearance of 14′ 2″. The roadway will be approximately 100′ below sea level and the top of the Tunnel averages 60′ below water.

The Department of Highways completed a scale model of the Tunnel and approach roads which was on display at the Virginia State Fair held in Richmond the week of September 25th and also at the Highway Conference held at the Virginia Military Institute in Lexington, Va., on October 6, 7 and 8th.

Over a period of 18 months ending June 30th, three major traffic surveys were completed and numerous changes made in the City of Lynchburg. One of the outstanding accomplishments was the widening of Memorial Avenue and Langhorne Road in the vicinity of the new high school and improvement at the intersection of these two streets. A time actuated signal was replaced with a vehicle-actuated signal, a traffic island was constructed, sight distances improved and channel lanes painted on the pavement.

Other improvements included, curb parking spaces in the downtown area were rearranged, the number of load zones increased and each space designated by a special sign. The signs are made of small steel strips fabricated to fit the round parking meter post, and in the case of load zones, the post is erected to the height of the parking meter so that the sign will be at eye level. This method of signing has improved the appearance of the streets, is most effective and has been adopted by other cities. Curb radii were increased at 10 intersections to provide better turning space for vehicles. 111 requests were received from individuals for load zones, no parking arterial stop signs and other changes in traffic regulations during the period. After careful investigation, 53 of the requests were approved, 43 appeared to be unjustified and 13 are pending action.

Widespread improvements in signs and signal systems, one-way patterns, and citizen participation in traffic planning helped earn Richmond the top traffic engineering award of the National Safety Council among 18 cities of the 200,000 to 350,000 population bracket.

With a top national award for its traffic engineering effort in 1953 under its belt, Richmond has set its sights on conquering the big bugaboo—the parking problem—next.

A survey disclosed that there was a shortage of about 2,321 parking spaces in the Ninth and Main Streets and Fourth and Grace Streets (the main business district). To cope with this problem, Council has set aside $230,700 for the acquisition of land incident to the development of off-street parking facilities where private enterprise fails to or cannot provide them.

Also in long-range view for the future alleviation of the parking situation and reduction of traffic congestion are multi-lane street operation, reversible one-way arteries, temporary one-way peak-hour designations, and increased peak and off-peak bans on parking where necessary.

The "Walk-Don't Walk" lights were enforced in Richmond effective August, 1954.

West Virginia

Claude A. Rothrock (Mem., ITE) and Robert E. Titus (Jun., ITE) of the State Roads Commission, State of West Virginia, who are recovering from an automobile collision from which they miraculously survived have been the two main cogs in the wheel of uniformity and standardization of traffic control

Letter to the Editor

Sir:

Last summer my wife and I made a 7,000-mile automobile trip to the West Coast, during which we traveled through sixteen states, and we got along fine, thank you, until we hit Illinois on our way home.

I admit we got slightly lost in Albuquerque and drove about sixty miles out of our way but this was strictly my own fault; I simply zigged when I should have zagged. But you can get lost in Illinois even when you read the road signs. In fact, the more you study the signs the more confused you become.

We had a lot of trouble in the vicinity of Moline but this was nothing compared to the problem which we encountered as we tried to sneak up on Mendota. About fifty miles west of this community, on Highway 92, we came to a Y in the road. Glimpsing a highway sign with an arrow pointing left for Mendota, I took the left fork, whereupon my wife loudly objected. The sign, she insisted, pointed to the right fork. Instead of engaging in a silly argument I turned around and drove back to have another look. We were both right. The sign is absolutely impartial. (Kodacolor photograph of same enclosed.) One arrow points left for Mendota, while

another arrow, directly below, points right for Mendota.

I studied a couple of road maps and the position of the sun, all to no avail. Finally I took the left fork and stopped at a gas station to check. "You're all right, mister," the attendant assured me. "That sign pointing right don't mean nuthin'."

But maybe it does. Maybe, if you take the right fork you can get to Mendota by way of New Orleans or Peoria. I wouldn't know. But if so, why keep it a secret?

I just thought I'd give you a brief report on how one roadway sign helps to break the motoring monotony in Illinois.

DON SLUTZ
Managing Director
Traffic Safety Association of Detroit

---

devices throughout the State of West Virginia. Their program requires that all traffic control devices installed on the State Highway system, within and without cities and municipalities, conform to the "Uniform Manual on Traffic Control Devices." For each installation of a traffic signal, sign or other control devices, an application must be submitted to the State Roads Commission for study, approval or objection. This procedure fortunately is not a mere formality, but an absolute and effective tool in obtaining standardization and uniformity which already is showing marked effect in reducing congestion, confusion and accidents.

Western Section

Clipped from the October WesternITE

National Convention

Western Section was represented at the Kansas City meeting by 25 members and 10 non-members from the Western States. After the efforts of the first two days in behalf of "San Francisco in '56," most delegates thought there were 200 of us. And while on the subject it is:

SAN FRANCISCO IN 1956!

The arrangements committee had provided banners, lapel pins, photographs, motion pictures, place cards, bracelets for wives of the Board of Directors, and chewing gum with special wrappers. From headquarters in "Harry's Hideaway," (the Presidential Suite courtesy Mrs. W. E. DeYoung and Mrs. Leo Jennings), the campaign spread like congestion on the Hollywood Freeway.

By noon Monday all competition was flattened and it was a shoo-in when the Site Selection Committee met. The only thing delaying the decision was the mysterious absence of AL HEAD. The committee paged all the public bars and eating rooms. He and AL MALO were finally dredged out from behind a sofa in the AGA room.

Sunday afternoon the Board of Directors were the Section's guests at a private recital by "Harry" in the Presidential Suite. On close inspection "Harry" turned out to be J. E. BAUER of Los Angeles but his "Missouri Waltz" was reportedly better than the original.

Technical Program

On the more serious side, Western Section members on the program included LAMAR GARDNER, BRUCE CRANDALL, NORM KENNEDY, JOE HAVENNER and LLOYD BRAFF. Also on the program was LARRY SMITH of Seattle speaking on "The Traffic Problem Created by Automotive Shopping."

As a new note in technical programs, the later sessions were divided into urban and rural and consisted of round table discussions of committee reports. Future meetings will follow a similar pattern and will be directed by the Technical Council rather than the local committee.

Membership

The membership committee reported a total membership of 891, a gain of 112 during the last year. Western Section was one of those singled out for congratulations on a gain of 54 or 77% of its quota. New members approved at the latest Board Meeting are: HAROLD DURHAM, SALEM SPITZ, THOMAS HUNT, and GERALD MATTHEWS. The headquarters room was a big success with the feature attraction a model train layout with 22 switches, three engines and eleven switchmen. I understand that both FRANCIS BURTON and MARTIN WALLEN gained the score (each chargeable accident counted one), equivalent to "Yale Graduate." That rating was next to low. The low category, "ITTE Master," was not reached by anyone. The honor category was entitled "Tough Switchman" and was attained by WesternITE's BOB DIER and Denver's GERALD ROTHWEILER. I don't understand how they did so well as they were engaged in a deep conversation about hunting—something about caging squirrels. And speaking of hunting, LYNN STEWART and BOB EVENSON went —well, never mind.

W. S. S.

A new organization was formed during the convention entitled Western Section Sojourners with GORDON GRAVELLE as all of the officers (at last report the treasury had $0.25). This group of ex-WesternITE'S has a reported charter membership of 26—somehow Chief Justice Warren got on the list—and claims that it will soon rival Western Section in size.

(Continued on page 174)

POLICE RADAR DROPS DEATH TOLL

POLICE RADAR CREDITED WITH DROP IN DEATHS

Radar, a wartime developed detection device, has been aimed at highway

ENFORCEMENT OFFICIALS CREDIT
ELECTRO-MATIC® RADAR SPEED METER
WITH CUTTING HIGHWAY DEATH TOLL

NATIONWIDE SURVEY CITES RADAR

Most reports from states using Electro-Matic Radar Speed Meter say it's cutting down accidents. The latest state to install it and the state which pioneered radar's use in patrolling highways are equally enthusiastic about the results, an Associated Press survey found.

Virginia State Police, one of the first users of radar, in an expanded program credit radar for the reduction in the death toll on the Fourth of July weekend. There were only 7 deaths this year compared to 21 last year.

Radar Speed Meters have been used for a year by the

Kansas highway patrol. They note a 12 per cent reduction in traffic fatalities and conservatively say radar "may have played some part."

Mississippi State Police credit radar with a 77 per cent reduction in traffic accidents.

HOW THE SPEED METER WORKS

Continuous speed measurements of vehicles approaching or receding in the path of a radar beam are taken directly with the Model S-2 Speed Meter. Speed readings are plainly and directly indicated in miles per hour, day or night and under all weather conditions, on the illuminated meter scale or on the chart of the auxiliary Graphic Recorder.

Readings of speeds up to 100 mph are accurate within 2 mph. The Speed Meter can be set up and operating in less than three minutes on either car battery or 120 volt A.C. power. A single ON - OFF switch is the only control necessary for operation.

Either one-man or two-man usage of the S-2 Speed Meter is practical. Under the one-man system the Transmitter -

Receiver Unit is connected by a small cable to the Indicator Unit at the point down the road where the officer is stationed. Departments that favor two-man usage utilize two cars, the first car mounts the Radar Speed Meter and is in radio-telephone communication with the intercepting car at a suitable location down the road.

MANY ADVANTAGES OFFERED

1. Police can check far more vehicles than with a cruiser car.
2. Hazards to pursuing officers and motorists are eliminated.
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7. Either one-man or two-man usage of the Speed Meter can be employed.

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Index to Advertisers

A'G'A DIVISION OF ELASTIC STOP NUT CORPORATION 131
G. M. Basford Company, New York, New York

AUTOMATIC SIGNAL DIVISION OF EASTERN INDUSTRIES, INC. ... 173
Remsen Advertising Agency, New Haven, Connecticut

BROADWAY MAINTENANCE COMPANY (Veon Chemical Corp.) .. 151
Peck Advertising Agency, Inc., New York, New York

CROUSE-HINDS COMPANY ..... 132 & 169
Barlow Advertising Agency, Inc., Syracuse, New York

DENVER PLASTICS, INC. 152
Ball & Davidson, Inc., Denver, Colorado

DUAL PARKING METER CORPORATION 134
Griswold-Eshleman Company, Cleveland, Ohio

DUNCAN PARKING METER COMPANY ..... Inside Front Cover

EAGLE SIGNAL CORPORATION 136
Boudinot Advertising Agency, Davenport, Iowa

INTERSTATE RUBBER PRODUCTS CORPORATION 165
Walter C. Davison Company, Glendale, California

KARPARK CORPORATION 159
Smithson, Wyman & Withenbury, Inc., Cincinnati, Ohio

MAGEE-HALE PARK-O-METER COMPANY 164
McCormick-Armstrong Company, Wichita, Kansas

MINNESOTA MINING AND MFG. COMPANY 161
Batten, Barton, Durstine & Osborne, Inc., Minneapolis, Minnesota

MIRO-FLEX COMPANY 153
Associated Advertising Agency, Wichita, Kansas

MUNICIPAL STREET SIGN COMPANY 174
William Gennaro, New York, New York

PORTABLE TRAFFIC SIGNALS, INC. 160
Mack-Wharton Advertising, Los Angeles, Calif.

PRISMO SAFETY CORPORATION ..... Back Cover
Michener & O'Connor, Inc., Harrisburg, Penna.

RADIATOR SPECIALTY COMPANY 158
Bennett-Evans Company, Charlotte, North Carolina

TUTHILL SPRING COMPANY 170
Burlingame-Grossman, Chicago, Illinois

WALD INDUSTRIES, INC. 162
Michener & O'Connor, Inc., Harrisburg, Penna.

Membership Applications

The following applications have been received since the list of applicants published last month.

APPLICATIONS FOR TRANSFER

BAUCH, William Frederick, Jr.
Expressway Traffic Engineer
Illinois Division of Highways
Chicago 1, Illinois
November 29, 1954 for MEMBER Grade

HUMPHREY, Hilliard Dale
Traffic Engineer II
Bureau of Street Traffic
Chicago, Illinois
November 29, 1954 for ASSOCIATE Grade

KEITH, Robert Alfred
Planning Engineer
Ramp Buildings Corporation
New York 17, New York
December 13, 1954 for ASSOCIATE grade

NEW APPLICATIONS

ANGELL, James E., Jr.
Assistant Traffic Engineer
City of Indianapolis
Indianapolis, Indiana
December 9, 1954 for JUNIOR Grade

BENNETT, George Harby
Traffic Signal Engineer
Pennsylvania Department of Highways
Harrisburg, Pennsylvania
December 13, 1954 for ASSOCIATE Grade

JOHNS, Kenneth B.
Traffic Engineer (Electrical)
Kentucky Department of Highways
Frankfort, Kentucky
December 6, 1954 for ASSOCIATE Grade

OAKES, Roy E.
Assistant Civil Engineer
Department of Public Works
San Francisco, California
November 29, 1954 for JUNIOR Grade

PETRILLO, Paul Carl
Assistant Traffic Engineer
Department of Law and Public Safety
State of New Jersey
Trenton, New Jersey

RATNER, Robert John
Highway Engineer
Rader Engineering Company
Miami, Florida
November 29, 1954 for ASSOCIATE Grade

WEINBERG, Irving Benjamin
Assistant Design Engineer
Province of Ontario—Dept. of Highways
Queen's Park, Toronto, Ontario, Canada
December 13, 1954 for ASSOCIATE Grade
November 29, 1954 for JUNIOR Grade

SECTION NEWS

(Continued from page 172)

Idaho

The Traffic Division of the Idaho Department of Highways was represented at the recent WASHO meeting, at Sun Valley, by the attendance of Ellis Mathes, Traffic Engineer, and Lew Ross, Assistant Traffic Engineer. Our Division was also represented at the ITE meeting in Kansas City by Traffic Engineer Mathes.

The Department of Law Enforcement for the State of Idaho has recently ordered five radar speed meters. It is intended that they be used in a proposed campaign to enforce the speed limits posted on the State Highway System.

The Department of Highways is completing final arrangements to put in effect Idaho's first one-way couplet. The location is on US 30 N in the City of Pocatello. The couplet is proposed for approximately one and one-half miles on Main and Arthur Streets which pass through the badly congested business area of Pocatello.

The Idaho Department of Highways has discontinued the practice of installing, during the school year, the sign which reads "Speed Limit 20 mph 8 A.M. to 5 P.M. School Days." Permanent zones based upon sound traffic engineering studies are recorded for all year round operation. These zones vary from a minimum of 25 mph to the maximum posted limit on the open highway of 60-day 55-night. There are, however, two or three zones which were passed for 20 mph with the hope of this Department that they can be raised to 25 mph in the near future. We believe this can be done. Year round 25 and 35 mile zones in urban areas with rural limits from 35 to 60 miles per hour, depending upon specific circumstances, will then prevail throughout the State on the State Highway System.

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